FOUNDRY TRADE JOURNAL

EST. 1902

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Offices: John Adam House, John Adam St., London W.C.2

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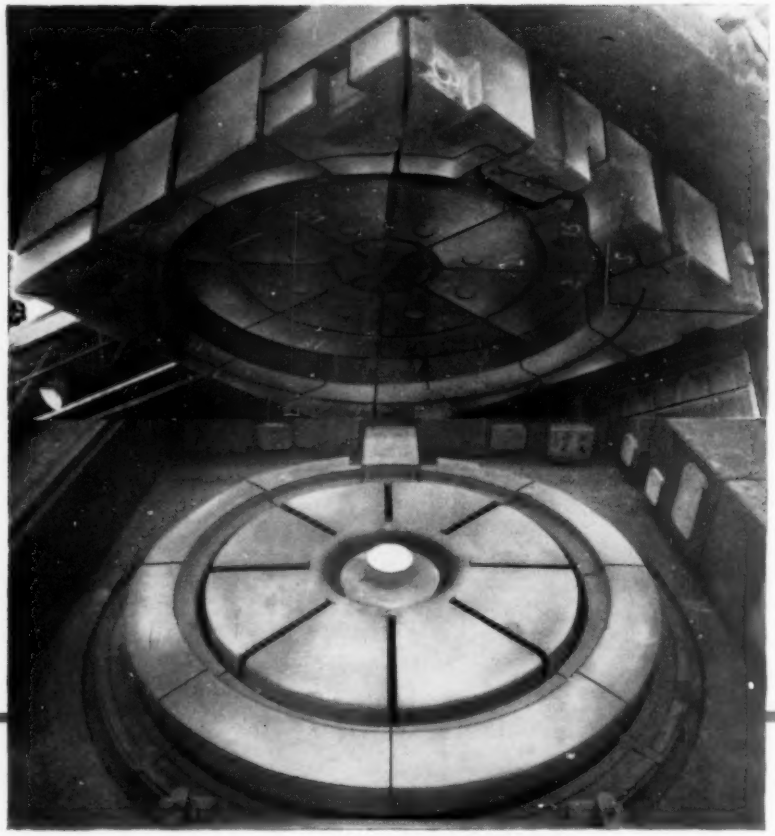
THE ERITH RANGE OF SANDS

For the finest iron and non-ferrous castings.

Obtainable in four grades of loam and silica sand for oil and CO_2 cores.

Write for illustrated brochure and free samples to:—

J. PARISH & CO. ERITH. KENT.



These two photographs show the top and bottom parts of the mould before they are closed.

79 HOURS SAVED IN COREMAKING

This 14 ft. square casting for a George Richards' horizontal borer incorporates intricate cores. By using the Corovit cold-setting technique the accuracy of the cores is improved and coremaking time drastically reduced—from 180 to 100 hours. The immense strength of the core is well illustrated by the massive overhangs.

COROVIT is manufactured and sold in the U.K. solely by FORDATH, who prepay licence fees to Reichold Chemie A.G. of Switzerland. Reichold are the proprietors of British Patents 653,530 & 761,035. *Thus foundries using COROVIT are automatically free from liability to suit for infringement of these patents when they use peroxide-group accelerators in their cold-setting work.*

Photographs by kind permission of George Richards & Co. Ltd., Broadheath, Altrincham, Cheshire.

ASK FORDATH TO TELL YOU ABOUT **COROVIT** COLD-SETTING TECHNIQUE

THE FORDATH ENGINEERING COMPANY LIMITED, BRANDON WAY, WEST BROMWICH, STAFFS, ENGLAND
Telephone: West Bromwich 1665 Telegrams: Fordath Telex West Bromwich Telex No: 33415

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	Sorelmetal D-I	Sorelmetal F-I
Carbon	2.40 %	4.25 %
Sulphur	0.025	0.015
Phosphorus	0.025	0.025
Silicon	0.08	0.08
Manganese	0.009	0.009

RESIDUAL ELEMENTS

	%		%		%
Chromium	0.035	Titanium	0.020	Aluminium	0.015
Copper	0·025	Vanadium	0.025	Tungsten	0.001
Nickel	0.085	Cobalt	0·040	Molybdenum	0·001
				Tin	0.001

Sorelmetal is consistently uniform
. . . shipment to shipment
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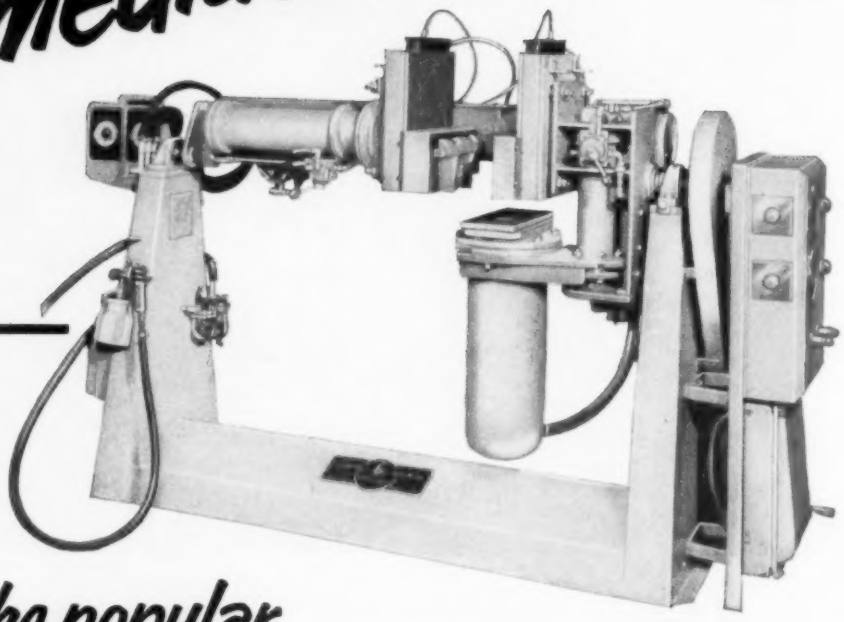

of the popular

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SHELL CORE BLOWER

Produces finished single or multiple cores, ready for setting in 30-50 seconds. Compact and complete in itself—no other equipment required. Investing and curing automatically controlled. Handling of hot core boxes eliminated. Any type of core can be blown in shell. Maximum box sizes accommodated: Model A 16" x 15", Model B 21" x 15".

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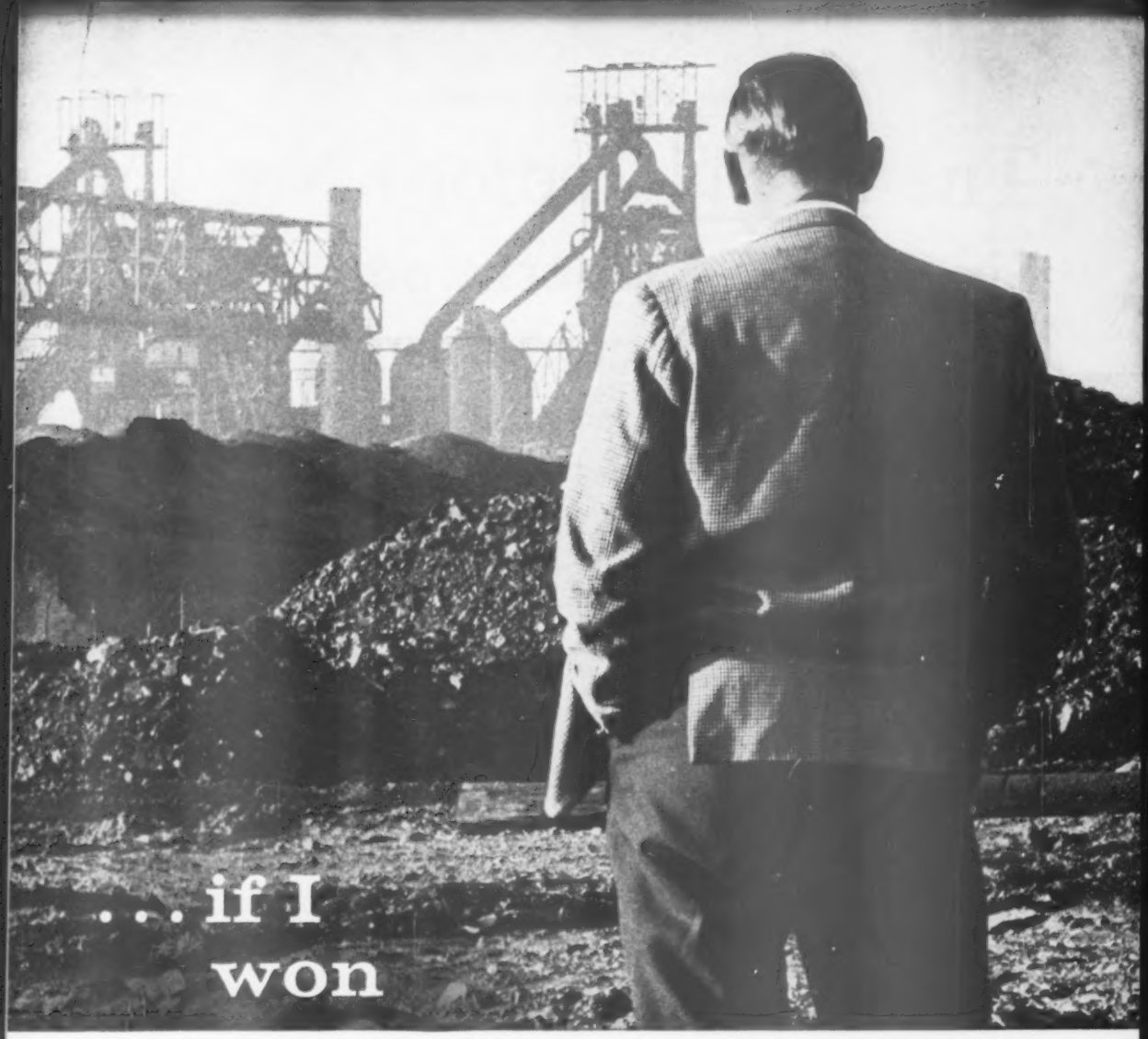

the pools

". . . and I might at that if a couple of teams I could mention were to buy themselves some decent centre forwards.

"Football is a funny game. One week a club is a world-beater and yet a few days later they can be licked to a frazzle by a team from a girls' school.

"Heaven help us if we carried on that sort of caper at AW. Customers don't want firms that are up one minute and down the next. When buyers come to a company with our reputation they expect—and get—a reliable performance. Fancy telling them that a load of pig wasn't up to specification because one of our furnacemen was off form!

"I reckon I'd get a coupon up every week if footballers were only half as consistent as the AW team."

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A2

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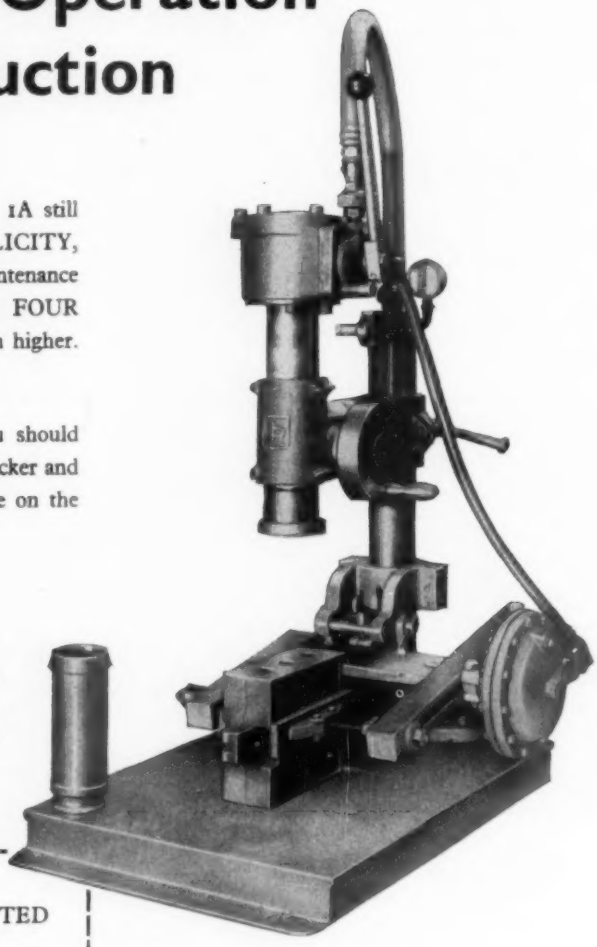
If you make cores up to 2 lbs. you should use a Redford. It will make them quicker and cheaper than any comparable machine on the world market today.

It has great adaptiveness and is used widely co-operating the CO_2 process and the design provides rapid action to all adjustable parts, including the pneumatic clamps.



To BRITISH RONCERAY LIMITED

Please send me further details of the Redford Core Blower/Redford Pneumatic Clamp without obligation.

Name .....

.....

Just attach to one of your letter-headings and post to-day to:—

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14, WOLSELEY ROAD, SHEFFIELD 8

Because

WET SCRUBBING will reclaim used sand in condition equal to new

you can now save hundreds of £'s

Used core sand whether oil, resin, C.O.2, air set or clay bonded can now be reclaimed in condition equal to new. This is achieved by wet scrubbing and counterflow classification. The potential savings in many foundries can amount to hundreds of £'s per annum. If you are interested, please ask for an engineer to call.

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The Roper Automatic Charging Cycle Installation can also incorporate other modern features such as Slag Granulation, Wet Arresters, Water Cooled Melting Zones, etc., etc.

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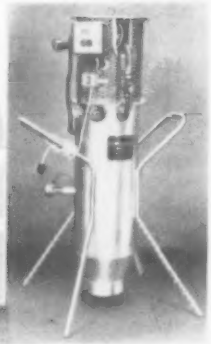
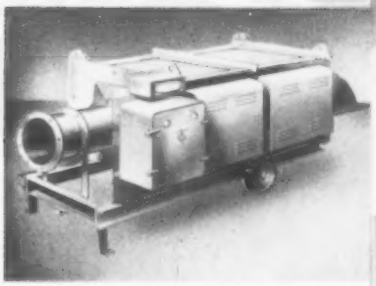


Axial Jet M Gas Fired



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—for Economy
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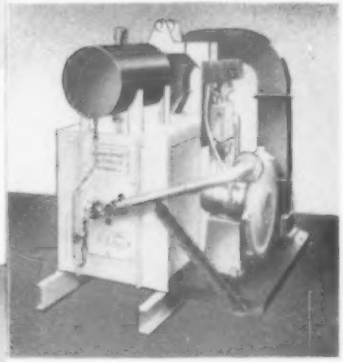
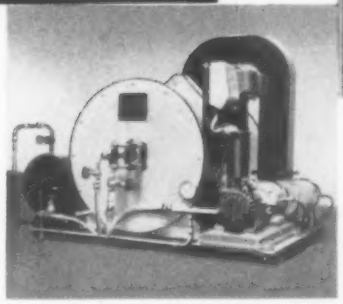
—Reliability



"Newstad" Oil Fired



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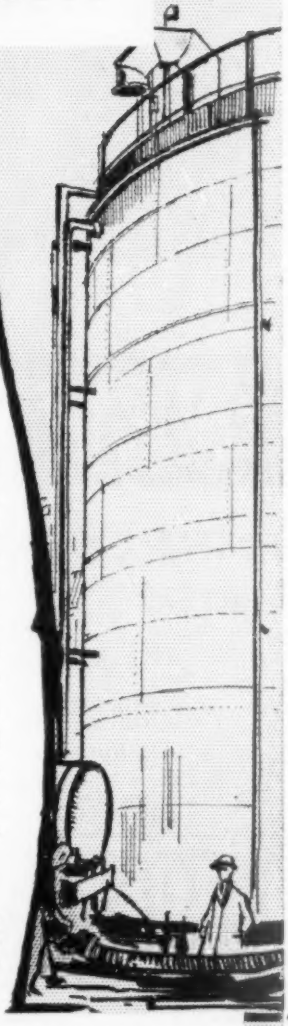

. . . have been since 1925, in fact, when I joined as a lab. boy. Today, I'm manager of the company's sulphuric acid plants—and I wouldn't change my job for anything. I feel sure I'm one of a team, and that's the way it's always been here ever since the Berk brothers founded the company more than ninety years ago. My own work gives me practically a direct link with them, as it happens. You see, sulphuric acid was the very first acid this firm produced and we've been improving our production methods all through the years. Now, of course, we manufacture considerable quantities and one of my jobs is to look after the storage tank—the largest in Europe—which holds the molten sulphur from which the acid is produced. Today, Berk acid is used for more batteries than any other made in Britain. But that certainly isn't the only chemical we make. I suppose our products touch on almost every branch of chemicals there is—each developed by experts to perform its task to perfection. That's how everybody gets the best out of Berk.

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British Patent No. 629292

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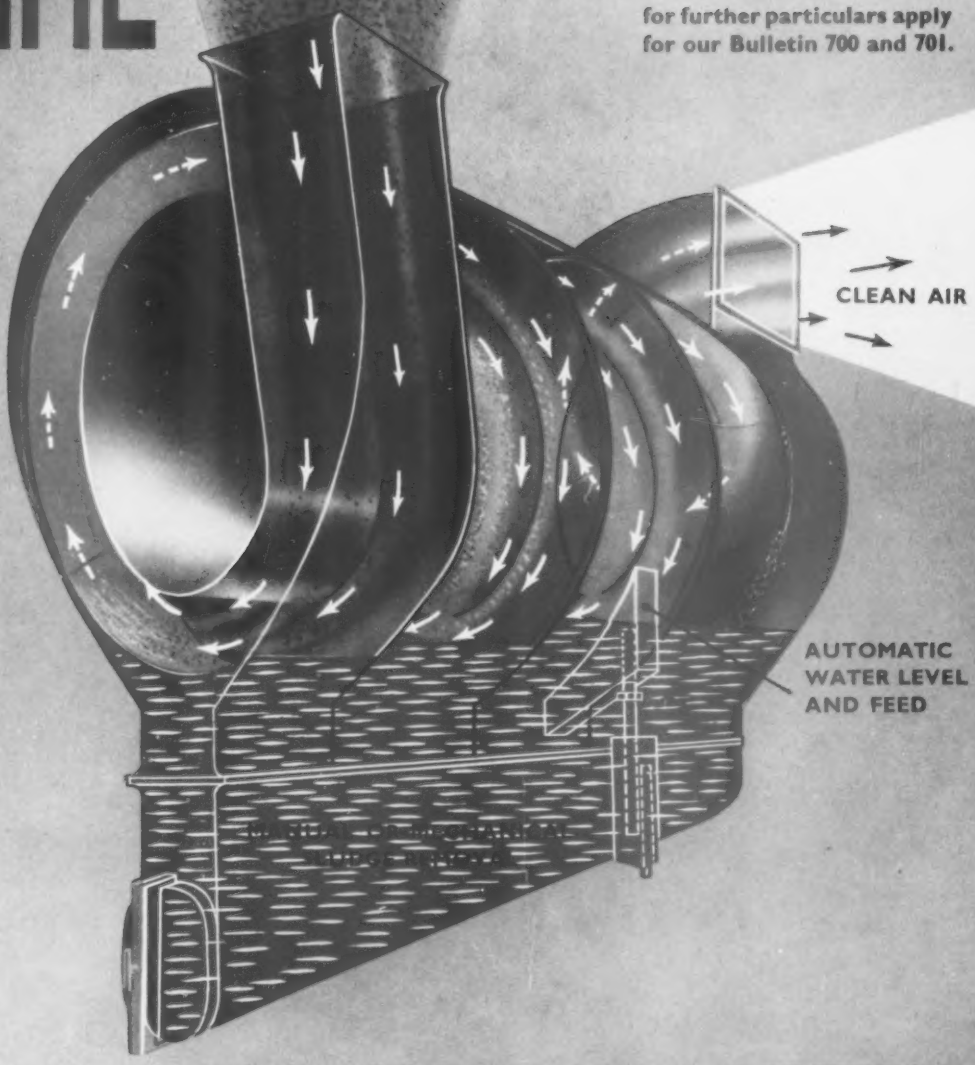
for further particulars apply for our Bulletin 700 and 701.



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Sterling boxes in a world-famous foundry

At the Carron Company's world-famous foundries at Falkirk, tunnel segments for the new Linthouse-Whiteinch Tunnel under the Clyde are now being cast in Sterling rolled steel moulding boxes. The weight of the castings is approximately 15 cwt. per section and the box dimensions are 30in. by 95in., cope 9⅛in. deep and drag part 22⅛in deep.

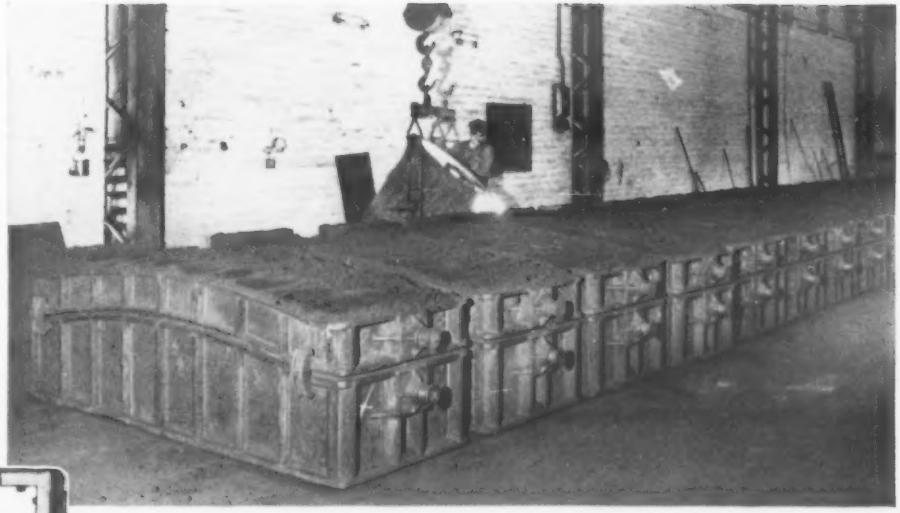

Illustration shows the type of box used for this operation.

618 Cogent

Sterling MOULDING BOXES

STERLING FOUNDRY SPECIALTIES LIMITED, BEDFORD.

FOCUS ON 'FULBOND'

No 2 Bond Development

FULBOND combines rapid bond development and high initial strength enabling moulding sands to be prepared quickly and economically. In addition, the use of FULBOND gives the technical advantages of increased flexibility, wider control and a much more resilient sand.

Where Milling Time Can Be Varied

When a sand mix is milled the strength increases rapidly at first then more gradually until finally no further increase in strength will be obtained. Additions of FULBOND will ensure that optimum bond strength is developed in the shortest possible time. This will eliminate any undeveloped clay in the sand avoiding the bad effects of excess clay and also increasing the output of milled sand to the maximum possible.

Where Milling Time Is Fixed

In mechanised foundries using continuous mills or where, due to the demand for sand, milling time is limited, only a fixed short time can be given. Undeveloped clay will therefore be present, this being wasteful and requiring extra moisture which reduces permeability. FULBOND will keep the content of undeveloped clay to a minimum.

Advantages can also be obtained by using FULBOND in unmilled sands prepared on the foundry floor.

For a copy of this Brochure please write to:

THE FULLERS' EARTH UNION LIMITED

Patteson Court, Nutfield Road, Redhill, Surrey

A member of The Laporte Group

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Attention
to
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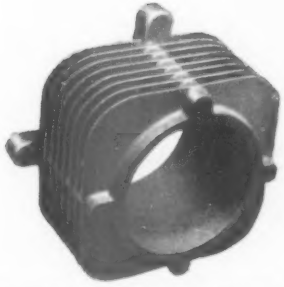
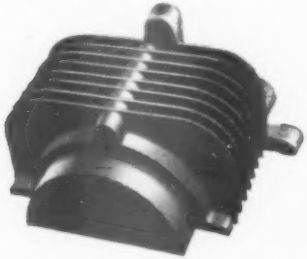


Araldite pattern and casting for a Cooper-Stewart rotary compressor body, made by J. Hobkirk Sons & Co. Ltd, Bedford.



Araldite epoxy resins provide intricate foundry patterns which require no cleaning up before use. The photograph shows the high finish of the Araldite pattern and the metal casting it produces. A pattern cast in Araldite cures at room temperature with no appreciable shrinkage, so that no allowance need be made for double contraction. An Araldite pattern wears better than its aluminium counterpart, can be produced easily, quickly and economically and will not deteriorate in storage. May we send you full descriptive literature ?

Araldite

epoxy casting resins

Araldite is a registered trade mark

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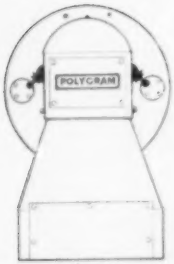
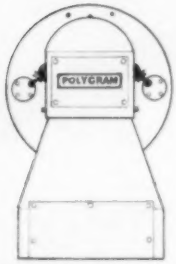
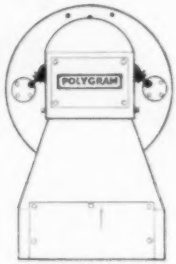


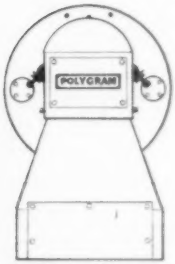
SHELL COREMAKING



SHELL MOULDING

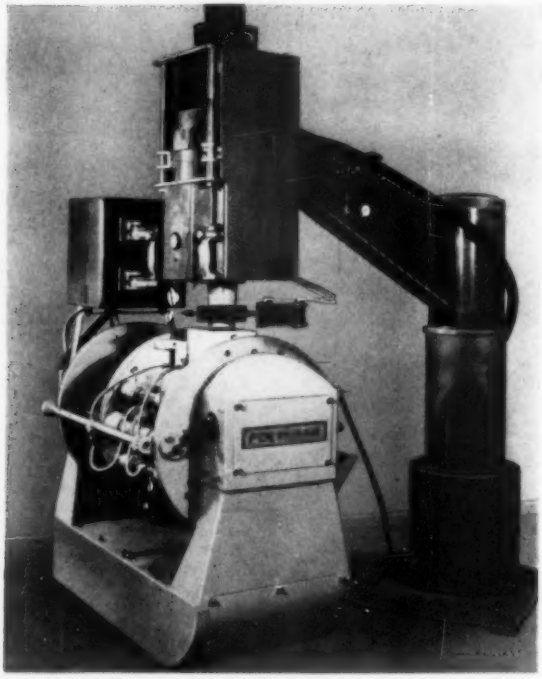


HOT-BOX PROCESS



GRAVITY DIECASTING

ONE . . . Polygram MANIPULATORS for SHELL COREMAKING



This shows a Manipulator in use with the latest Polygram column-mounted Coreblowing head.

Polygram Manipulators are the ideal method for handling large shell coreboxes (up to a maximum size of 28in. by 18in.) since they offer the following advantages:—

Full pneumatic operation from closing box to ejection of core.
Automatic control of operation if desired.
Temperature of each half of corebox electrically regulated within $\pm 5^{\circ}$C.
Can be used with existing core blowers or shooters.
Single-Station Core Blower (see above) can be built up to Six-Station Machine by adding Manipulators.

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Polygram *Casting Company Limited*

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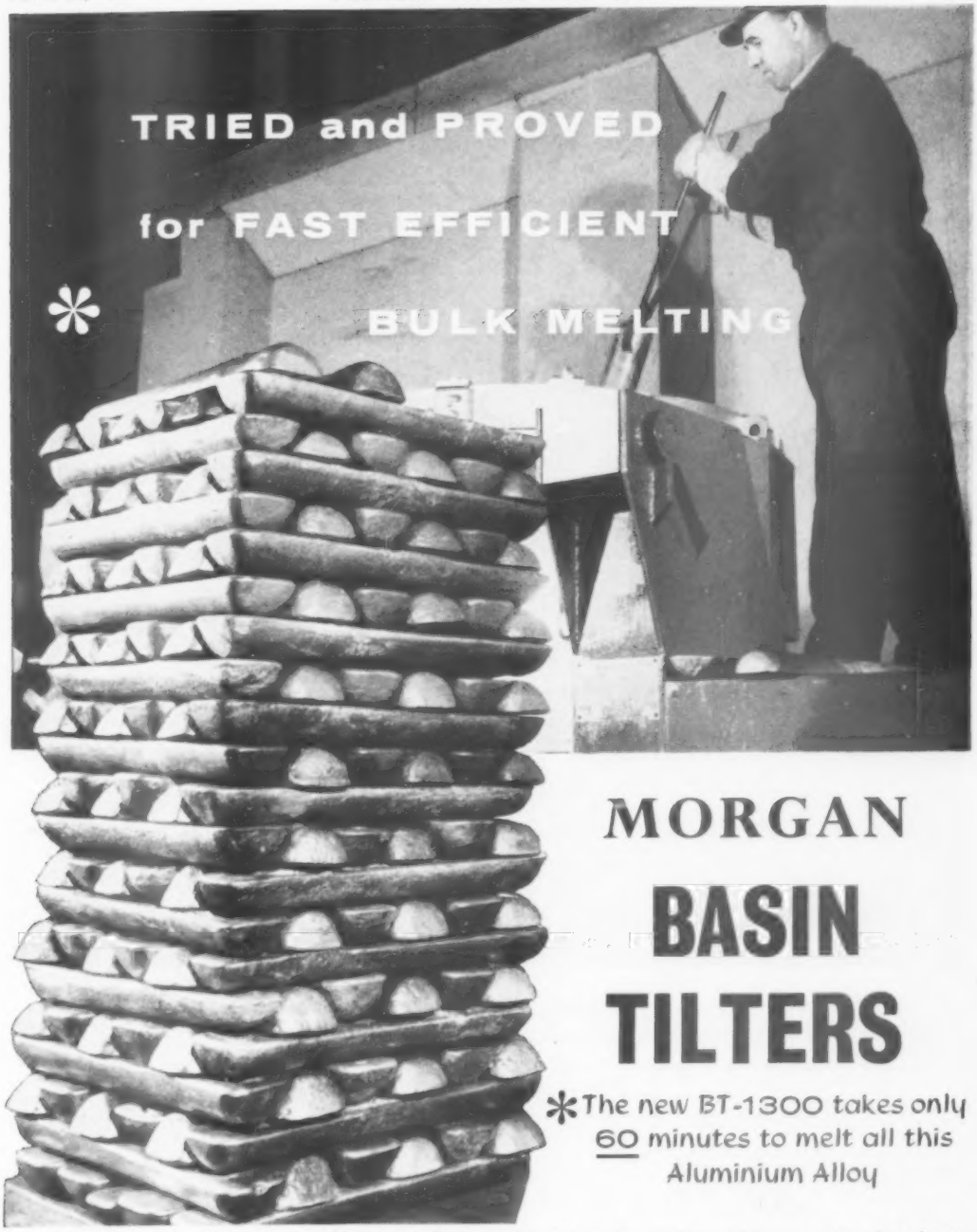
SHERNFOLD PARK, FRANT, TUNBRIDGE WELLS, KENT, ENGLAND.
TEL. FRANT 346

The Only British Specialists in Shell Moulding and Coremaking



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*The new BT-1300 takes only 60 minutes to melt all this Aluminium Alloy

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For top quality castings and lowest melting loss, invest in the most flexible of all bulk melters. Ask for a demonstration, with your own metal if preferred, at the Battersea Test Foundry.

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But man **can** *control the other three,*
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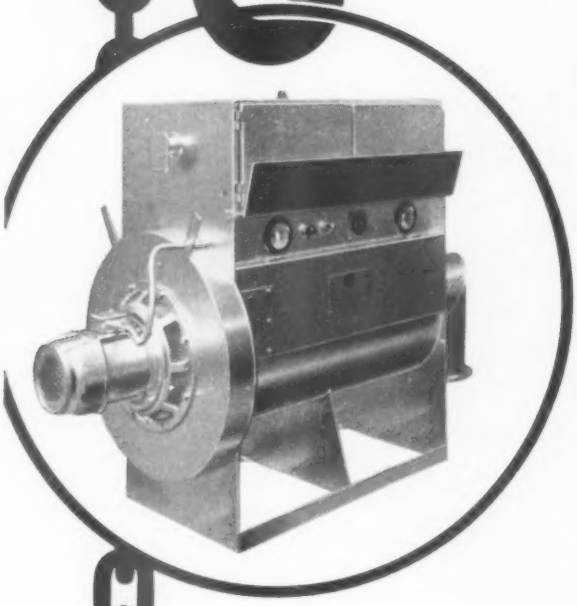
BROWN BOVERI

PORTABLE ELECTRIC MOULD DRIERS



. . . designed for drying floor moulds or large box moulds for ferrous and non-ferrous metal castings. They operate by forcing hot air over the mould surface and through the sand giving quicker and more efficient drying than is normally achieved by other methods. Using air temperatures lower than hot gases, and less than one third the quantity of heat, they reduce drying times by half. Heating is uniform throughout the mould and despite rapid drying, surfaces remain free from cracks and cleaner castings are produced.

* Driers need no attention during operation.
* Power input is regulated automatically.
* Working conditions are improved by elimination of smoke and burning gases.

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Hicycle tools are of special interest to you

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CONSOLIDATED PNEUMATIC

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We've been supplying ingots for many years that are consistently excellent by any comparison and to any specification. We'd be pleased to show you just how close to perfection they really are.

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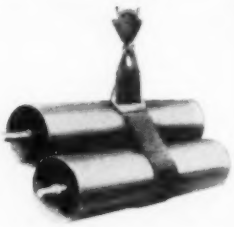
SHORT HEADROOM. Light weight. Compact and highly efficient. Capacities from 1 ton to 20 tons.

'WEDCO' WIRE BELT SLINGS



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The " Wedco " wire Belt Sling has the strength of steel combined with maximum flexibility and a wide bearing surface giving exceptional load stability.
Made from thousands of strands of sturdy woven wire in a smooth transverse loop construction " Wedco " Wire Belt Slings cannot snap or tear. They are safer, easier to handle, faster to rig and will not whip, kink or tangle.
In the field of mechanical handling this is something you should know more about, write us for the fullest details.

RATCHET HOISTS

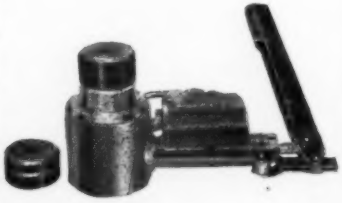
Incorporating a patented Overload Preventer giving greater security and safety to the operator, also reducing wear and saving cost of maintenance. A free - wheeling feature enables quick adjustment of unloaded chains

BABY 60 ELECTRIC HOIST BLOCKS

BRITISH MADE. Patents Pending. 5 and 10 cwt. capacity. Light weight, compact and portable. Pushbutton control. Upper and lower overtravel limit switches. Supplies for any height of lift to suit requirements. Top hook suspension facilities attachment to travelling trolleys or girder clamps, etc.

LOW LIFT JACKS

Large capacity for use in confined spaces. Swaying under load eliminated by large diameter providing easy adjustment of height. Capacities from 10 to 30 tons.



TRAVELLING CHAIN BLOCKS

Blocks built-in to Travelling Trolleys, giving reduced head - room. Capacities from 1 ton to 20 tons.

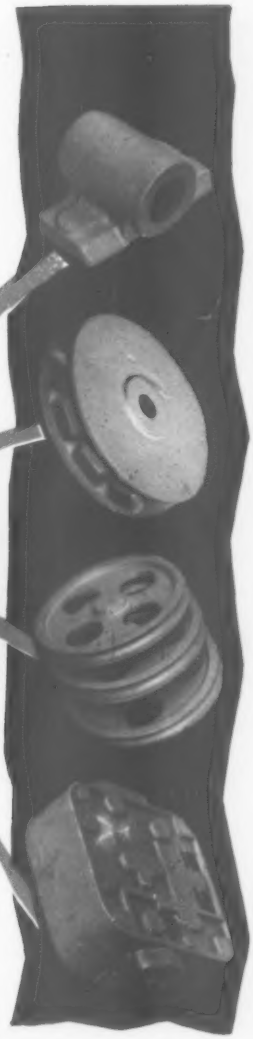
FELCO HOISTS LTD., 29 CROMWELL ROAD, SOUTH KENSINGTON, LONDON, S.W.7

Phone : KENSINGTON 7401 (4 lines) *TELEX 24118.* *'Grams: 'FELCOHOIST,' LONDON, TELEX*

F3

ONE MAN AND HIS CENTRIBLAST

AIRLESS ROTARY BARREL CLEANING MACHINE



. . . in only one hour can thoroughly clean one ton of miscellaneous castings — no wonder they say CENTRIBLAST CLEANS FAST!

Not only fast and thorough—the airless Barrel Centriblast has other vital advantages too . . . built-in desilter . . . efficient general dust control . . . low power consumption . . . slow speed of rotation . . . and of course no compressed air whatsoever.

The Barrel may not do your job, but there's a Centriblast machine that will! Tell us the job and we'll tell you which!

SPENCER & HALSTEAD LTD BLAST CLEANING DIVISION OSSETT YORKSHIRE

Powney/S. 31

If your plans for continued business growth and profits include mechanised equipment — we've a good mind to do it for you!

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Tel: Leytonstone 2254 Grams: Engimarco, Esphone
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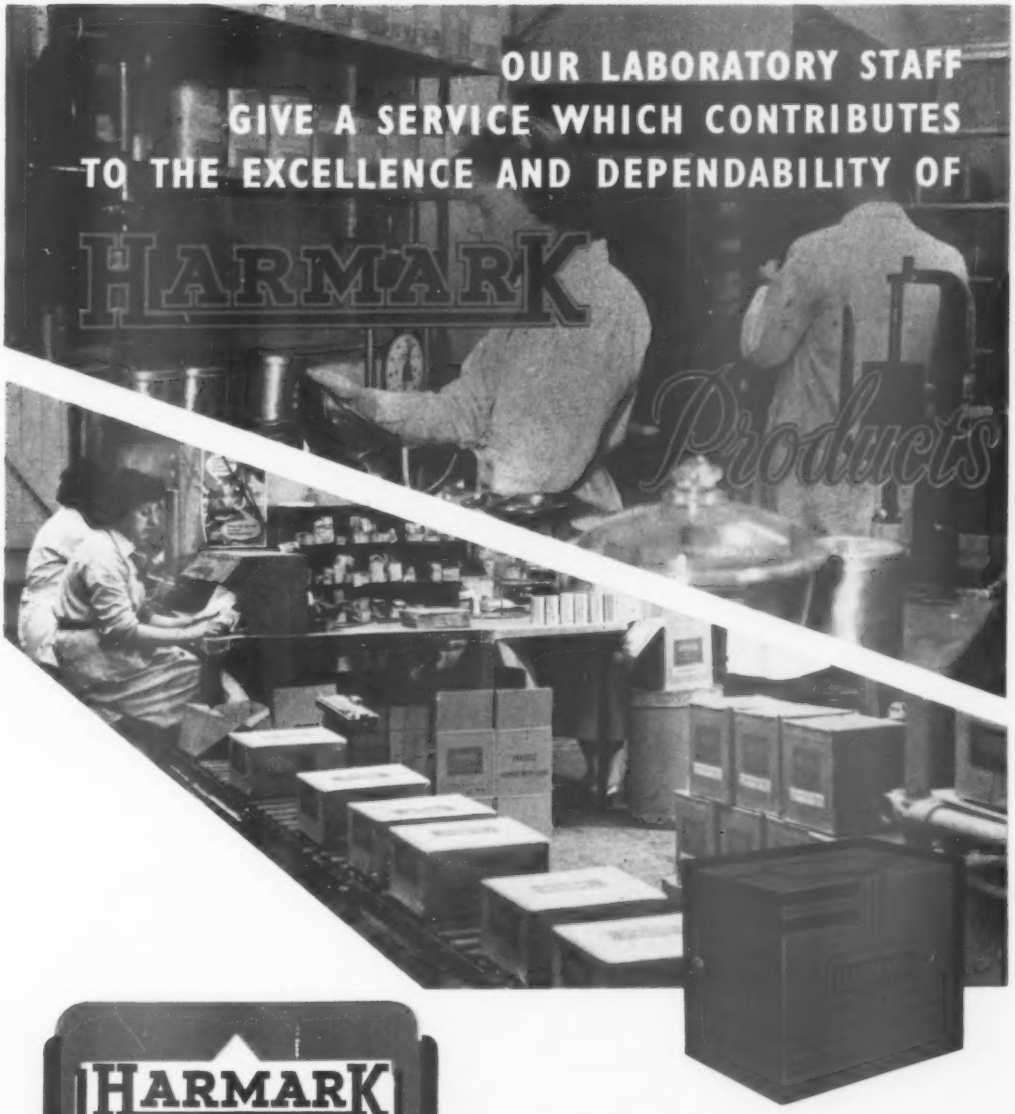
UNSEEN BUT UNCEASING...



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FOUNDRY SUPPLIES

Manufactured by

HARBOROUGH CONSTRUCTION CO·LTD·MARKET HARBOROUGH

FOXBORO

Foundry Instrumentation

Weigh all the air

THE FOXBORO AIR WEIGHT CONTROL SYSTEM is specially developed to provide the Foundry Industry with Uniform Cupola Control. This completely Automatic System controls the weight of Air delivered to the Cupola, reduces fuel consumption and makes possible :—

UNIFORM HEATING
BETTER POURING
HIGHER QUALITY CASTINGS

In addition, Foxboro Systems are available for measuring, recording or controlling — Pressure, Humidity, Dewpoint, Temperature and many other variables.

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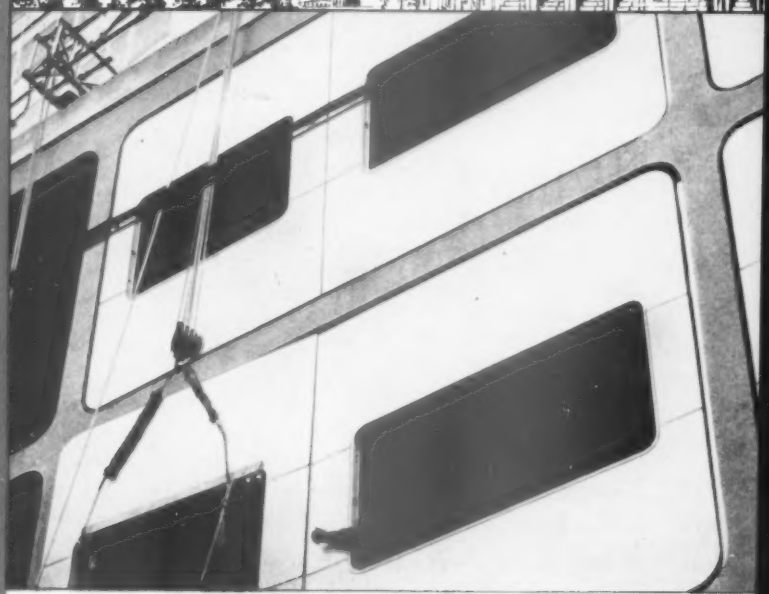
REDHILL • SURREY • ENGLAND

'The most graceful new building in Western Europe'

Headquarters of the giant Pirelli organisation in Milan, this new building has been recognised as a superb example of imaginative architecture in the modern idiom, using modern materials . . . including, of course, Foseco products for the treatment of molten metals—Coveral*, Degaser*, and Nucleant*—to improve the weathering properties of aluminium window frames.



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Phone: EASt 1911 (10 lines) Grams: KUPRIT, Telex B'ham
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HEPBURN • Pangborn

Solve the Problem

This company produces a diversity of castings in alloy iron and hematite iron. These include ingot moulds for the steel industry, brake drums and liners for Public Passenger vehicles, machine tool castings, gear wheel blanks, Colliery castings and General Engineering castings. The problem here was to find a suitable Shot Blast Machine to clean castings from one pound to two tons at lowest total cost and to speed production.

for **ALLOY & STEEL IRON CO · CHESTERFIELD & SHEFFIELD**

THE SOLUTION . . .

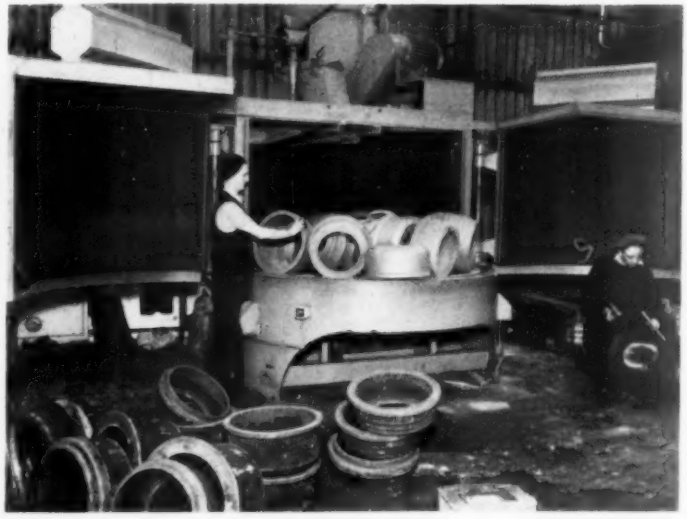
After seeing the Pangborn LK 6ft. Rotablast at the 1958 Foundry Exhibition they decided to instal this machine to replace an Airless Rotary Barrel which was limited to size and weight of castings it was able to clean.

●

THE RESULTS . . .

1 Machine easily installed.
2 No Foundations required.
3 All Castings produced are now cleaned by machine.
4 50 per cent. increase in Output is now cleaned by same number of operatives.
5 No Breakages of Thin Castings.
6 Considerable saving of shot.
7 Fettling keeps pace with output.
8 Perfectly clean Castings to customers on time.

Blasting time three minutes



HEPBURN CONVEYOR

Telegrams: CONVEYORS
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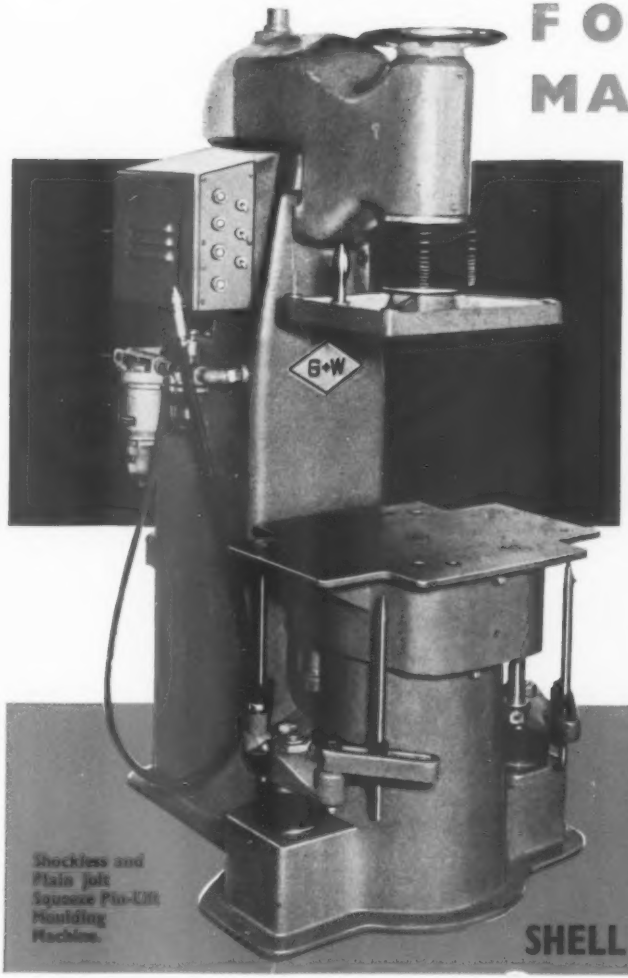
G+W

From VERROLEC

To THE FOUNDRY

A Completely New Range of FOUNDRY MACHINERY



Shockless and Plain Jolt Squeeze Pin-Lift Moulding Machine.

including:

Jolt-ramming moulding machines. Flask Turnover and Pattern Drawing Machines · Shockless Jolt Rollover Moulding Machines · Squeeze Moulding Machines · Shockless Jolt-squeeze Moulding Machines · High-speed Turn-over Moulding Machines Flask Shake-outs · Vibrating Screens Core-blowers or Core Shooting Machines · Core turnover and Stripping Machines · Shockless Jolters Screen Shakers · All of advanced and dependable design.

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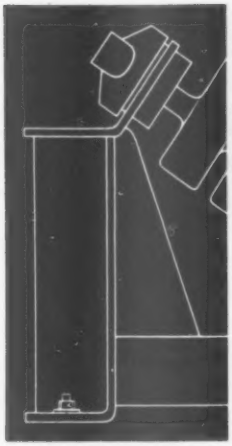
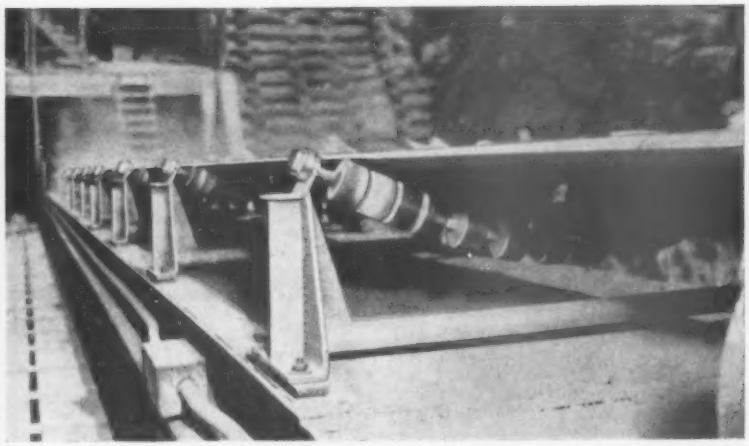
CAST IRON PIPES and JOINTS

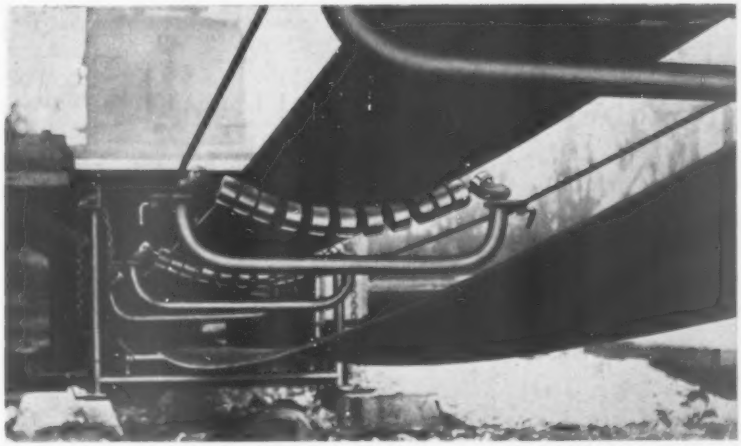
MOULDING SAND and GANISTER

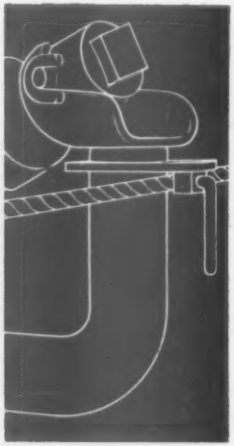
THE STAVELEY IRON & CHEMICAL CO. LTD.
NR. CHESTERFIELD DERBYSHIRE



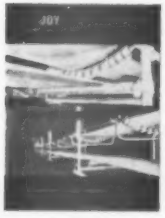


TWO SAVING WAYS WITH BELT CONVEYORS





JOY LIMBEROLLER IDLERS & LIMBEROPE CONVEYOR STRUCTURE



For the permanent structure—Joy Limberoller; a flexible conveyor idler that shapes itself to the load and can handle any bulk material transported by belt conveyors. It's saving? Because Joy Limberollers consist of hard wearing Neoprene discs moulded onto a flexible steel cable they exercise a self-cleaning action that saves belt and idler from damage, caused by material build-up under the belt. They cut spillage by giving a bump-free ride and need no maintenance.

Joy Limberope conveyor structures offer all the savings of the Joy-Limberoller plus easier and faster set-up, dismantling and relocating. They give a well-trained belt, are low in first cost... maintenance cost, and are easily transported from site to site. Savings indeed for any thrifty belt conveyor user!

JOY · SULLIVAN LTD

Bulletin CO. 361 with full details will be sent on application to:- **Joy-Sullivan Limited 7 Harley Street, London W.1.** or any of the following Distributors :—

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GLOVER & WOOD OF LEEDS
VICTORIA WORKS,
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NORTHERN IRELAND:
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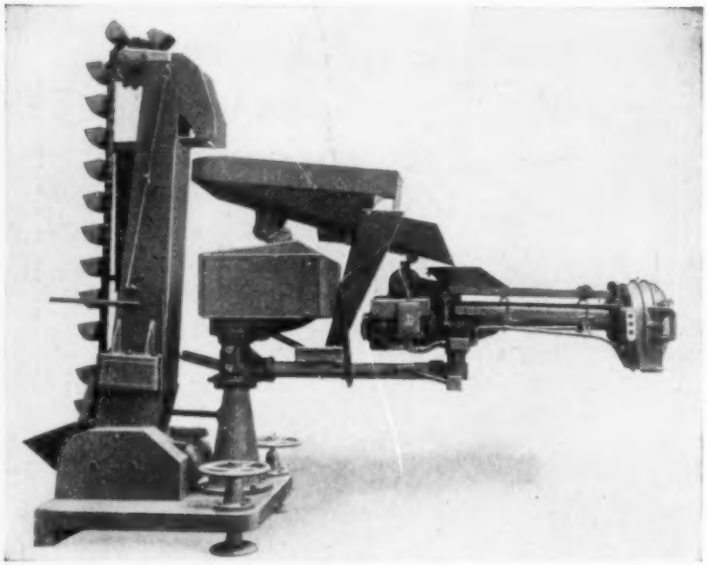
PORTABLE TYPE

Sandslinger

- Speeds up ramming and reduces costs
- Rams all ordinary patterns, large or small moulds alike
- No foundations or air supply required, a flexible electric connection sets the machine to work
- TOTAL radius of arms 10 ft. Maximum height 12 ft.



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Write Today for details:

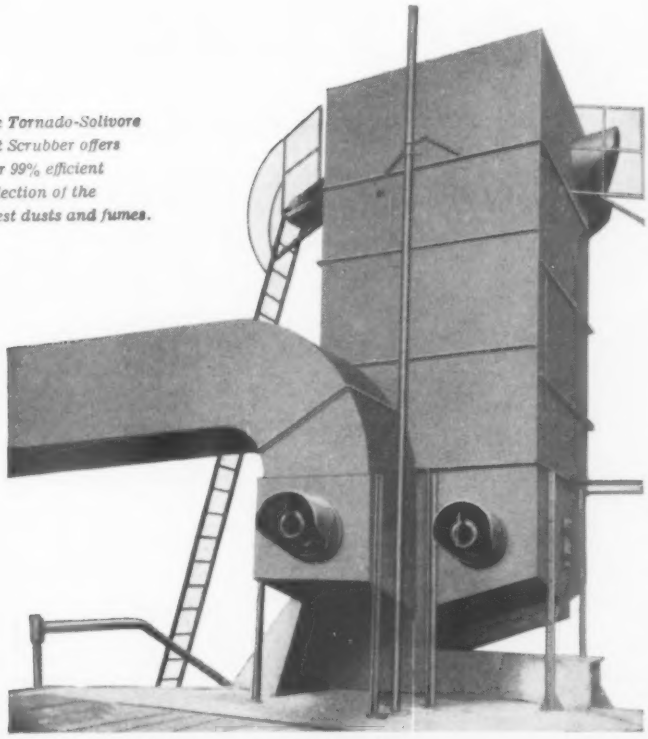
FOUNDRY PLANT & MACHINERY LTD.

EGLINTON WORKS, COOK STREET, GLASGOW C.5. SCOTLAND

Telephone: **SOUTH 2283**

Telegrams: **SANSLINGER, GLASGOW C.5**

The Tornado-Solivore Wet Scrubber offers over 99% efficient collection of the finest dusts and fumes.



when the problem's

DUST OR FUMES

turn to 'Tornado'

For over 60 years, Industry has turned to 'Tornado' to settle dust and fume extraction problems. Keith Blackman were the first in the country to use air extraction as the basis for dust and fume exhaust systems. With this record and this experience they are the natural choice for your problem. You too, should 'turn to Tornado' for advice on *complete plants* or individual equipment. There is a qualified representative in every industrial area.

Keith Blackman Ltd

Dust and Fume Control Division

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CLOTH FILTRATION

Tornado-Fischer patented, self-cleaning filters

Type 270/540 pocket filters

Series TF dust collectors

Series T self-contained dust collectors

WET FILTRATION

Solivore patented wet scrubbers

Hydro precipitator wet washers

CENTRIFUGAL FILTRATION

Cyclogal high efficiency, low resistance cyclones

Cyclogalax 'straight through' cyclones

Standard cyclones

PD-KB tubular collectors

ELECTROSTATIC PRECIPITATION

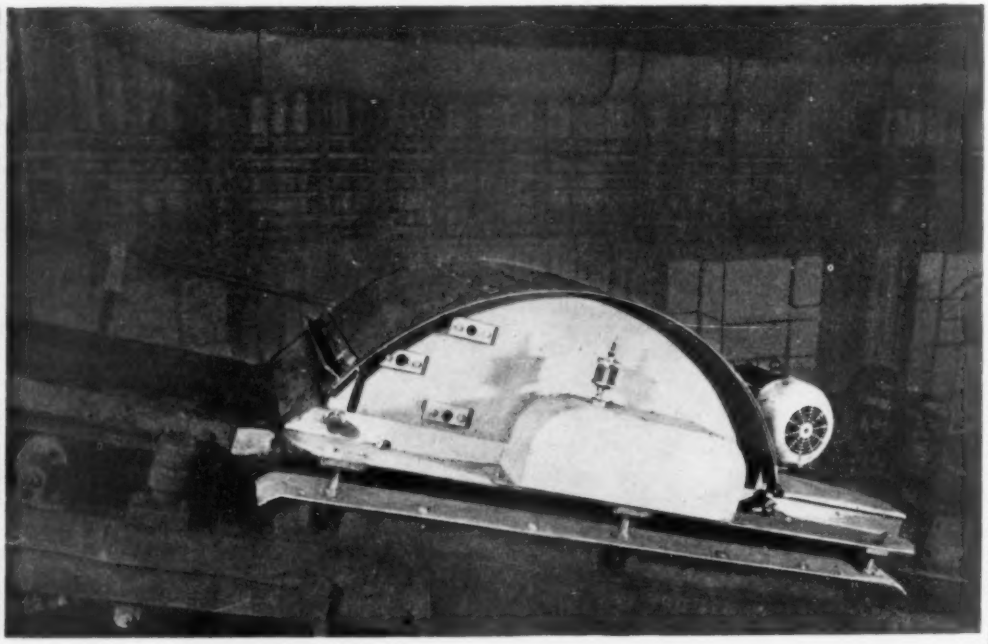
PD-KB electro-static precipitators

FANS

Paddle type industrial fans

Announcing the C.B.M.

PROVED · PRACTICAL · PRICE CONSCIOUS!



First introduced at the American Foundry Show, Cleveland, in 1958, several of these Aerators have been tried out in various foundries and now we offer them to *you!* We have always been able to offer an efficient Aerator or Disintegrator for any capacity. Now the C.B.M. has arrived!
The C.B.M. Aerator, for which British and Overseas Patents are pending, has these features—

- Available for any hourly sand capacity up to 100 tons per hour.
- Suitable for mounting over any width of flat belt conveyor.
- Can be incorporated in plants of our own design or in any plant, by anybody, anywhere.
- Can be used in new or existing installations.
- All you need is a flat rubber conveyor belt on the distribution side of the Sand Plant.
- Can easily and quickly be fitted with adjustable brackets or fixings.
- No independent supporting structure, platform or chutes needed—just mount it over a flat belt, inclined or parallel to floor level.
- No noise, jolting or vibration.
- Saves cost of additional supporting steelwork.

FE FOR FOUNDRY EFFICIENCY TRADE MARK

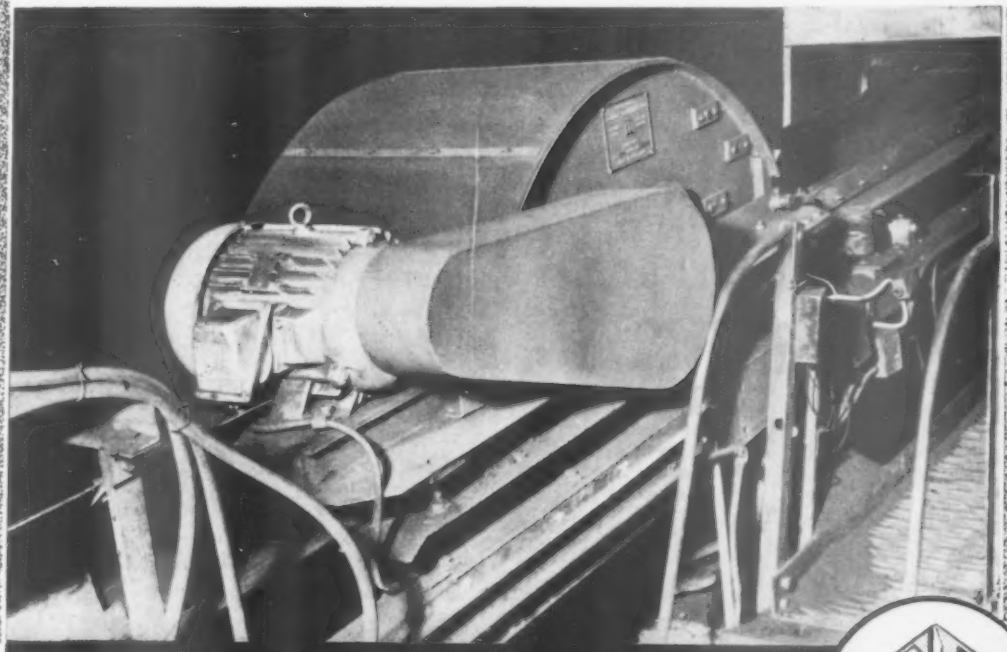
FOUNDRY EQUIPMENT
LIMITED
Leighton Buzzard, Bedfordshire, England
Telephone: Leighton Buzzard 2441 (5 lines) Telegrams: 'Equipment,' Leighton Buzzard, England

AERATOR...

The newest idea in Sand Aeration

- **Saves Elevator height and ideal for low headroom installations.**
- **C.B.M. is lower priced than other Aerators or Disintegrators.**
- **Can be installed in a few hours—cuts erection costs and does not interfere with production.**
- **Single low-powered electric motor drive—5 to 7½ h.p. is usually ample, even for high outputs.**
- **Vee rope drive and fully lubricated chain drive to twin paddles of special patented design.**
- **Machine is fully guarded.**
- **Quickly removable rubber cover for cleanliness, inspection and maintenance.**
- **Reduced maintenance—no pins to replace.**
- **Produces fully aerated "silky" sand for distribution to moulding lines.**

✱ *One of our clients already has four C.B.M. Aerators in their foundry plant—why don't you try one? All we want is a drawing of existing belt conveyor, decking and platform, and confirmed belt width and speed and maximum hourly sand output—we can give you a quick quotation and short dependable delivery.*



OVERSEAS COMPANIES:

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CANADA & U.S.A.: F. E. (North America) Ltd., Toronto.
SOUTH AFRICA: F. E. (South Africa) (Pty) Ltd., Johannesburg.
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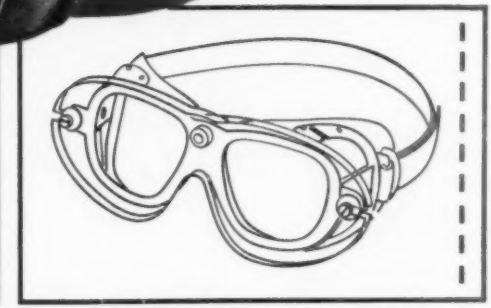
FOR FOUNDRY EFFICIENCY
TRADE MARK

LOOK AT IT THIS WAY

This new concept in eyesight protection must revolutionise industrial safety methods

PARMELEE have now evolved a new design eye-protector which could well prove to be the solution to many problems of eyesight protection in industry. Briefly, the new eye-protector design consists basically of a standard frame in toughened plastic which fits snugly round the eyes with overlapping acetate windows fitted externally to the front providing all-round protection and allowing ventilation to a degree hitherto unknown. The front windows are instantly removable and replaceable and will be available in a range which covers virtually every type of industrial requirement. It is the work of a moment for the wearer to remove one window and replace by another suitable for the immediate job in hand. If you are in an industry which calls for protective eyewear, you can see this important new contribution to industrial safety at the RoSPA exhibition at Scarborough on *STAND NO.* 43. If unable to visit Scarborough please write for full details.



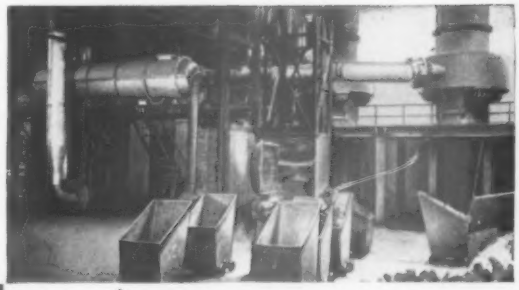
- Overlapping Acetate windows in a range to suit virtually all requirements, interchangeable in a second.
- Single or double windows with air space between, where extra protection is needed. Allowing super-abundant ventilation.
- Strong, comfortable, snug-fitting plastic frame.
- Side windows combine lateral vision with protection.

PARMELEE

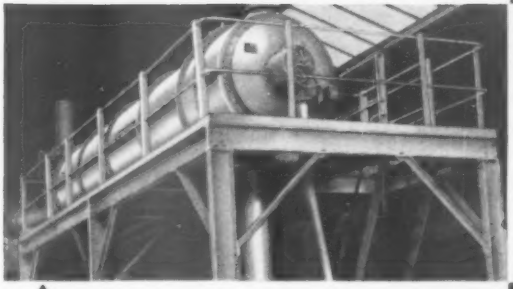
Right in front of your eyes

PARMELEE (G.B.) LIMITED · 39 BEDFORD AVENUE · SLOUGH · BUCKINGHAMSHIRE · TEL: 25191-2

Hot blast

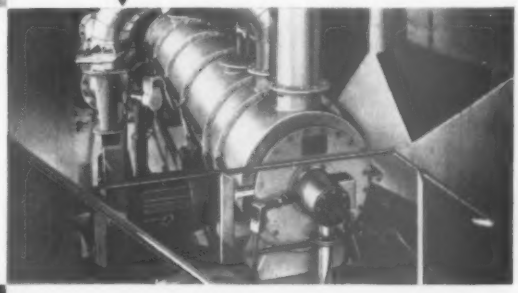


1 above Heater serving two 4-ton-per-hour cupolas producing blackheart malleable. Blast temperature 425°C.
(The Brockmoor Foundry Co. Ltd.)

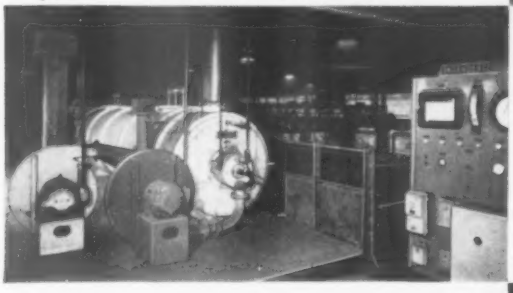


3 above This heater supplies hot blast to a pair of cupolas producing metal for air-cooled cylinder castings.
(Idoson Motor Cylinder Co. Ltd.)

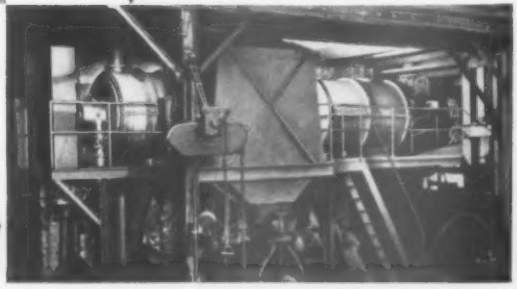
2 below A small blast heater connected to an unlined cupola with water-cooled shell. Blast temperature 300°C.



4 below Hot blast for two 4-ton-per-hour cupolas is supplied by this heater which is rated to deliver 2,000 s.c.f.m. at 500°C.
(Sheepbridge Equipment Ltd.)



5 below When floor space is at a premium the heater can be arranged to take up very little room. This unit is mounted on a platform and supplies blast at 450-480°C to a pair of 7-ton-per-hour cupolas.
(The Dudley Foundry Co. Ltd.)



The Incandescent independently-fired blast heater is designed and manufactured throughout by the Incandescent Heat Co. Ltd. Full details are given in leaflet FP.3—Incandescent Hot Blast.

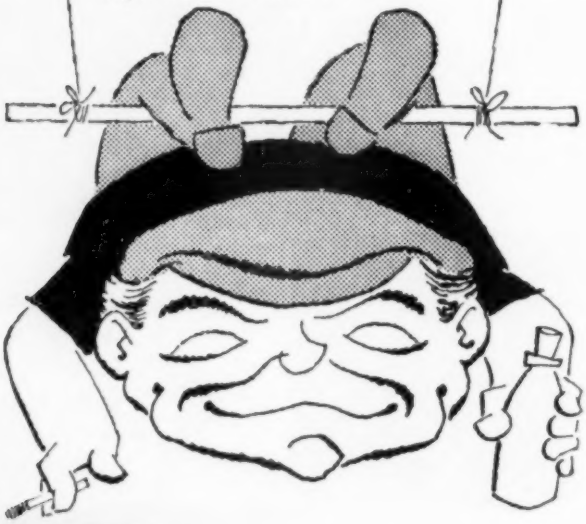
INCANDESCENT FOUNDRY PLANT

THE INCANDESCENT HEAT CO. LTD. SMETHWICK ENGLAND

7/4E/61

How do you like your suspensions?

You can have Foliac Colloidal Graphite Dispersions in a variety of carries, for example water, alcohol or white spirit —depending on the industry you are in and the application you have for these remarkable fluids. They can be sprayed or brushed to form electrically conductive coatings, and they can save pounds in die costs when used as lubricants and parting agents in die-stamping. They act as lubricants in drop forging too, and in metal, wire or glass extrusion processes, and they keep moving parts moving under high temperature conditions that would simply burn up oils or greases. Why not ask our representative to call?



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GRAPHITE PRODUCTS LIMITED
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PIG IRON

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CYLINDER
AND
HIGH DUTY
CASTINGS

The perfect pig-iron for cylinder and high duty castings . . . free from porosity and of high tensile strength. Our Technical Staff is always ready to assist users and to advise with regard to mixtures. We cordially welcome your enquiries.

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HATHERTON FURNACES BLOXWICH Nr. WALSALL STAFFS.

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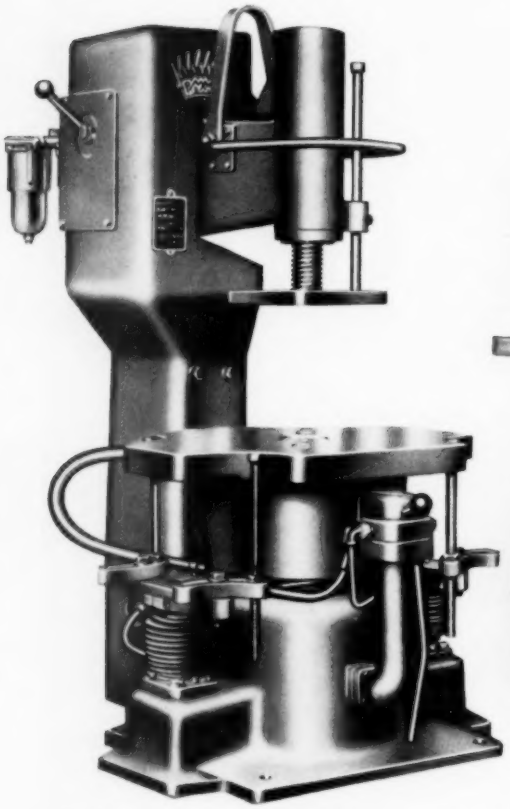
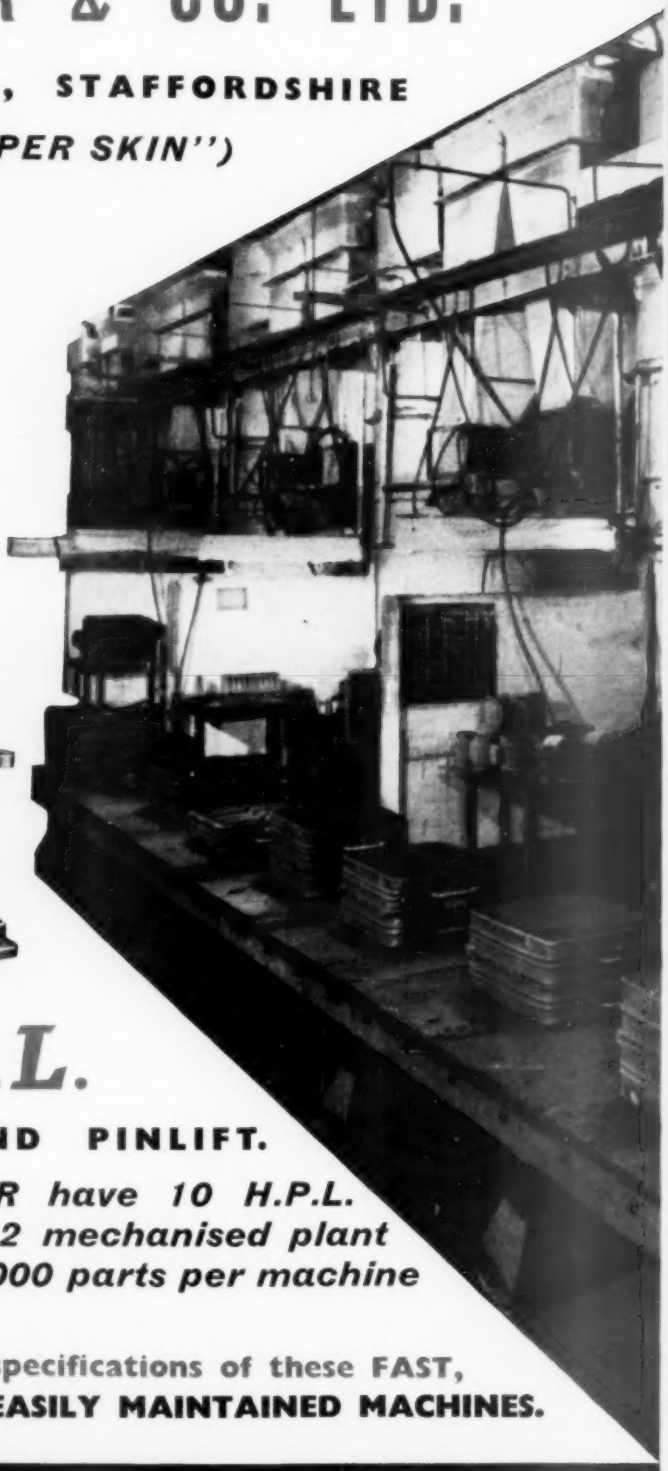
OF WILLENHALL, STAFFORDSHIRE

(famed for "THE HARPER SKIN")





Type H.P.L.

JOLT, SQUEEZE AND PINLIFT.

Messrs. JOHN HARPER have 10 H.P.L. machines in their No. 2 mechanised plant where they produce 1,000 parts per machine per day.

Write now for complete specifications of these FAST, EASY TO OPERATE AND EASILY MAINTAINED MACHINES.

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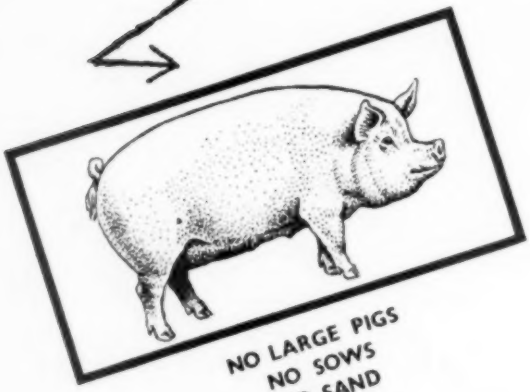

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Editorial Director:
V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

Editor:
A. R. PARKES, M.I.B.F.

Commercial Editor:
R. M. HOWSE

Production Manager:
R. J. LOVELL

Publisher: H. J. DWYER

Circulation Manager: E. T. GRIFFITHS

District Representatives:
G. P. ELLIOTT (Northern Area) 'phone: Altrincham 1334

T. H. SMITH (Scotland) 'phone: Dumbarton 1046

D. C. RYALL (Southern Area) 'phone: TRAfalgar 6171

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Telephone: Trafalgar 6171 (Private Branch Exchange)

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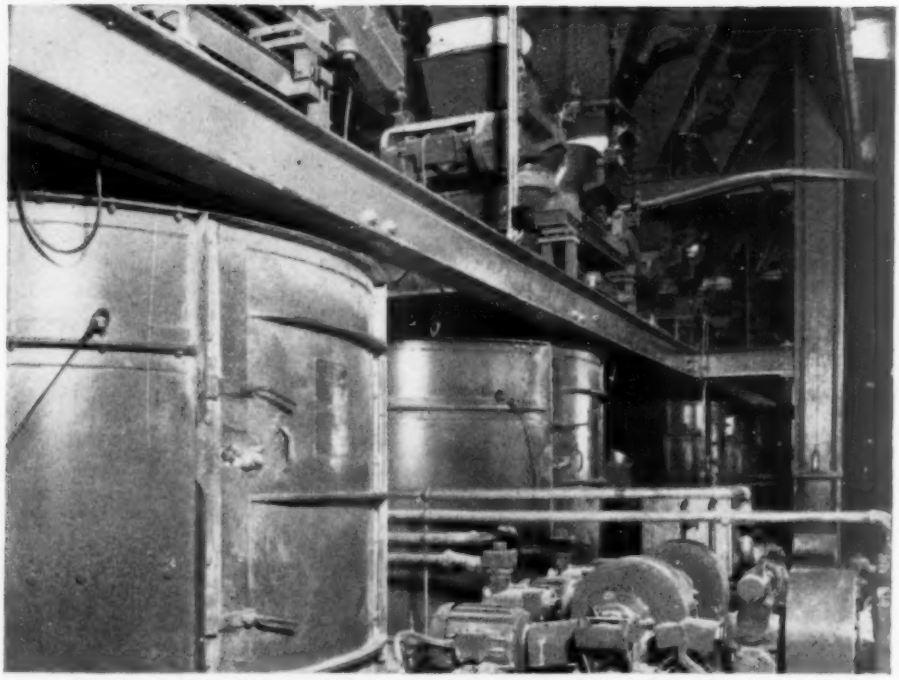

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FOUNDRY
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Vol. 110 June 22, 1961 No. 2324

Technologists for Industry

The foundry industry has been aware for some time of the need for a nationally recognized course, leading to a nationally recognized qualification at the highest level, and the extraordinary growth in the popularity of the Dip-Tech Course should be noted in this connection. There is also a growing movement calling for an award in the sciences concerned with particular industries, rather than in particular sciences, and our recent news item (issue of May 25) concerning the ceramic industry is a case in point.

The Minister of Education recently stated that British universities had 15,000 students in technological departments—those who were taking applied science as distinct from pure science, law, medicine, and so on. The Dip-Tech (short for Diploma in Technology), the first batch of students for which have qualified only recently, is equivalent to a university honours degree, and is provided for in the main at the new colleges of advanced technology, although specific courses are approved for other regional technical colleges. In 1959, of 2,500 students working for the Dip-Tech, no fewer than 1,900 were at these advanced colleges of which there are now about ten—Birmingham, Bradford, Bristol, Cardiff, Loughborough, Salford, the three London colleges (Battersea, Chelsea and Northampton), with Newcastle-upon-Tyne to follow. The current number of students following all courses for the Dip-Tech is nearly 5,000, of whom over 3,600 are at the advanced colleges. If to these figures we add the students preparing in the London colleges for internal London University degrees, and others preparing for London external degrees, it would appear that the Dip-Tech is rapidly overhauling the university degree in technology as far as the number of students is concerned. There is also evidence that the larger advanced colleges now controlled by their respective local education authorities will be put on a self-governing basis.

It is possible to take the Dip-Tech by means of three years full-time study at a college, plus one year in industry, but the alternative sandwich course lasting four years, half in industry and half in college, for six-monthly periods, seems to be the main reason for the success of the course. The contact with industry it provides is appreciated both by students and by employers. Practical experience gives significance to the studies and the employer gets an opportunity of assessing how far a student is adaptable to industrial life. This overcomes the objection felt in some industrial circles to the practice of employing graduates without any practical experience. The suggestion made by Sir Cyril Musgrave, chairman of the Iron and Steel Board, at the National Foundry College " Open Day " on June 2, that the Dip-Tech course would be suited to the foundry industry should be noted.

Commonwealth Technical Training Week

Ironfounding Industry's Part

The ironfounding industry in many different parts of Great Britain played an active part in Commonwealth Technical Training Week, which ended on June 3. Exhibitions were arranged and meetings and other events took place over the country, and a measure of the extent of participation of the industry can be gained from the overwhelming demand for copies of the literature prepared by the Training Committee of the Council of Ironfoundry Associations specially for the week. Nearly 35,500 give-away folders and 4,000 booklets giving a full account of

Part of the Council of Ironfoundry Associations stand at the Commonwealth Technical Training Week exhibition indicating the character of the pictorial display and illustrating by exhibits the processes involved in the production of a casting.

career openings in the industry were distributed by the CFA for use all over the country. Over 200 of the reply-paid postcards incorporated in the folder have already been returned, asking for copies of the careers booklet and the prospectus of the National Foundry College. At the London CTTW Exhibition in the City, the CFA stand attracted considerable attention. The stand illustrated pictorially and tangibly foundry jobs and methods, a drawing, pattern, mould, core and finishing casting illustrating the moulding process from start to finish. A highly successful "Open Day" was held at the National Foundry College on June 2, where the principal guest was Sir Cyril Musgrave, chairman of the Iron and Steel Board. The response everywhere to the week has exceeded expectations, and the openings offered by ironfounding as a career have been brought to the attention of a very large number of young people, career masters and parents through the many and varied events.

Development of Direct Melting

London-area members of the Association of Bronze and Brass Founders at their meeting at Hammersmith on June 7, were privileged to hear the challenging views and experience of Mr. W. B. Lawrie, M.B.E., HM Engineering Inspector of Factories, on the melting of non-ferrous metals and to question him on this subject.

Mr. Lawrie described investigations and experiments in direct melting carried out with the co-operation of members of the industry stemming from the demand in the Joint Standing Committee on Non-Ferrous Foundries for cooler working conditions and a reduction of fume. He said that from his background of steelmaking he had the feeling that non-ferrous founders did not know how to melt! The efficiency of present melting methods was low—about 13 per cent. for a bale-out furnace, and 87 per cent. of the heat went into the foundry which then had to be expensively extracted. The ideal, he went on, was to melt rapidly and pour immediately. Direct melting had been considered impossible and immediate pouring meant moulds should be ready and waiting for the metal—a reversal of non-ferrous practice.

Experimental Furnaces

Experimental furnaces or melting chambers had been constructed, of which the first raised fuel efficiency to 31 per cent., and the second, to 44 per cent., melting 16.7 lb. of aluminium per min. with oxy-propane gas. With the help of the North Eastern Gas Board a practical version of the melting chamber had been developed known as the ACRM (Atmosphere Controlled Rapid Melting) furnace, details of which were given in a Gas Board leaflet; this, without the use of pre-heated air which should give additional economies, melts 100 lb. of bronze in 7 to 11 min. at a fuel cost (gas) of 22.3d. and with greatly reduced melting loss. Mr. Lawrie looked for much better results by using smaller furnaces melting in controlled cycles. He dealt with members' questions very frankly and urged them to develop melting chambers starting from the ideas given and adapted to their own conditions.

The talk was preceded by the British Steel Founders Association's film "Your Eyes are Precious" and was followed by a discussion of promotion activities and arrangements for the autumn meeting to be held on September 13.

Latest Foundry Statistics

Copper-base Castings: The British Bureau of Non-Ferrous Metals announces in its June *Bulletin* that the output of copper-base castings for April was 6,845 tons. The total for the first four months of this year is 28,478 tons or 836 tons less than in the similar period last year.

Steel Castings: The Iron and Steel Board and the British Iron and Steel Federation in their May *Monthly Statistics* report that there was an increase in employment in steel foundries when the count was taken on April 8. At 18,940, there was an influx of 180 during the month, and of 910 compared with a year ago. The industry is currently employing 650 females. The estimated weekly output of steel castings in April was 5,900 tons. This compares with the estimated output of the previous month of 6,600 tons and with an estimated production of 5,400 tons in April 1960. To make this tonnage, 11,500 tons of steel were melted.

Progress at . . .
. . . International Combustion Limited

Survey of Foundry Developments related to Experience with Plant in Service.

It is obviously of value to foundrymen generally to print in the JOURNAL accounts of newly-equipped foundries, for it is then possible to examine the choice of plant and equipment made by the firm in question and compare it with other existing or projected schemes of modernization. Still further value accrues, however, if after a lapse of time following a new installation, a progress report can be made available. Then it is that other founders can study the practical working out in service of the various pieces of plant installed. Obviously, there has to be a "first" or test set-up with every foundry innovation and only a service report after perhaps years can complete the story as to whether or not the installation was worthwhile; maintenance records, too, are important in this overall appraisal. What follows is just such a report on various items of plant contained in the foundry of International Combustion, Limited, at Derby, the layout and equipment of which has several times been described in this JOURNAL.

As a preliminary to considering behaviour in service of various items of plant at International Combustion's foundry at Derby, it is proposed briefly to review the history of the works and the existing set-up. This will serve as a basis to the progress report for readers not having access to earlier reports which have appeared in the JOURNAL, and also as an *aide memoire* for those who are better acquainted with the plant.

History

The Derby works foundry of International Combustion, Limited, was laid down in 1922 and on November 6 of the same year the first casting was poured. At this time, the shop was about two-thirds the present length, and mechanization was very limited. All moulding was done on the shop floor, and the output varied between 30 and 40 tons per week. Metal for the entire shop was melted in two cupolas rated at 10 tons per hr. each and situated in No. 1 bay. In 1928, the shop area was increased by about half and a sand-preparation plant was installed. In response to the demand for small castings, several pneumatically-operated moulding machines were positioned in No. 3 bay, which was then to be used almost exclusively for plate and machine moulding, together with a large proportion of the centre bay used for jobbing moulding.

Due to the large demand for castings in the power-plant industry in 1931, the foundry was probably the busiest shop in the works, and snap-flask moulding was becoming very prominent. The patternshop was working at full capacity and the store carried upwards of 25,000 patterns, all of which were in regular use. The output was in the region of 100 tons per week, but proved insufficient, and mechanical methods and handling schemes were under discussion. After a short time, the cupolas were modified and in 1934, a continuous-casting and moulding plant was installed, to be used for general machine work of all types of castings up to about 40 lb. weight. This plant increased production considerably and shotblast equipment had to be installed specially for dealing with repetition castings. Foundry output was still rising and was fast approaching the 150 tons per week mark. It was thus found necessary from time to time to introduce further mechanical aids.

In 1951, it was again considered necessary to review the entire foundry layout, as further output was essential. A suitable scheme was drawn up and during the next six years, many modifications were carried out, including the installation of the mechanical cupola charging-plant, the application of the hot-blast to two cupolas, building a new coreshop and mould-drying ovens, putting in a mains-frequency electric furnace and a castings cooling conveyor, with many other improvements. The scheme included the addition of a core delivery conveyor, Hydroblast plant, an annealing oven and a new sand-distribution plant above and below ground. At present, the foundry capacity is approximately 250 tons per week.

Present-day Set-up

An appraisal of the Derby foundry as it exists to-day is best gained from considering the layout plan, Fig. 1, together with the following notes on operations carried out in relation to plant and equipment and its location within the overall scheme.

Passing in alphabetical order through the reference letters of the layout plan, A, denotes the large coredrying ovens. These are of the two-door recirculating type, size 22 by 21½ by 10-ft. high,

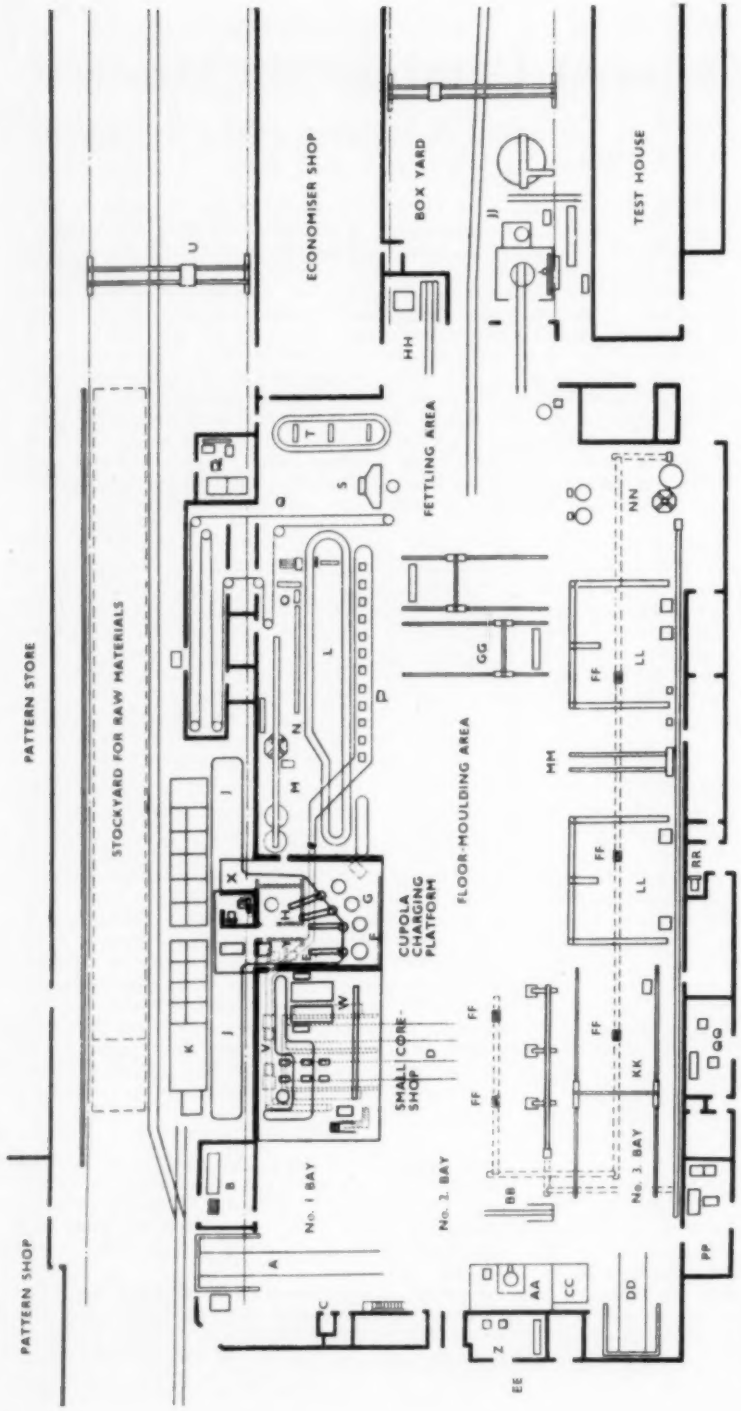


FIG. 1.—*Layout plan of the Derby Works of International Combustion, Limited, as it exists to-day.*

A, coredrying ovens; B, coresand drying plant; C, sand-testing room; D, mould drying ovens; E, fan house for cold-blast cupolas; F, cold-blast cupolas; G, hot-blast cupolas; H, recuperator for hot-blast plant; J, cupola-charging conveyor; K, charging bins; L, continuous-casting conveyor; M, sand distribution for continuous casting plant; N, flask knockout and screen; O, vibrating chute and push-off for moulding boxes; P, core-delivery conveyor; Q, castings-cooling conveyor; R, dust-extraction plant; S, shotblast plant; T, pallet-type fettling conveyor; U, stockyard crane; V, overhead core conveyor; W, coredrying stoves; X, fan house for hot-blast cupolas; Y, control panel for cupola-charging machines; Z, sub-station for 5-ton Birlec furnace; AA, Birlec furnace; BB, inoculating room for s-g. iron; CC storage platform; DD, annealing oven; EE, laboratory; FF, vibrating grids; GG, "H" tube moulding plant; HH, shotblast room; JJ, Hydroblast plant; KK, light moulding area; LL, heavy roller-conveyor systems; MM, Jackman moulding machine; NN, sand-distribution plant for No. 2 and No. 3 bay; PP, shell-moulding plant; QQ compressor house, and RR, fume-extraction plant from tunnel.

manufactured by International Combustion. Cores are wheeled inside on rack-type bogies. Fired by one Riley underfeed stoker at an oven temperature of 225 deg. C., drying time for a complete charge is six hours. The coal-firing equipment was also manufactured by I.C., Limited. The coresand drying plant is shown at B, here, sand is fed through a Syntron vibrating grid and discharged in a parallel and counterflow gas-fired drying and cooling unit. Conditioned sand is conveyed pneumatically by a Raymond No. 6 fan and air plant to storage over the mill to the coreshop. The handling plant was manufactured by the company and has a capacity of 4 tons per hr. The sand-testing room is shown at C and here milled sand is tested for permeability, green-strength and moisture content. These tests are carried out hourly—eight times per day—and the results are

displayed on boards which are placed adjacent to the sand mills. The mould drying ovens, which are of the recirculating type, are shown at D. They are 17½ by 32 by 10-ft. high and were manufactured by International Combustion. Moulds are loaded on bogies and are hauled into the ovens by an overhead crane. Each oven is fired by one No. 8 Riley Stoker and at an oven temperature of 235 deg. C., drying time for a complete charge is six hours. Each Stoker consumes 1 cwt. of coal per hour. In the cold-blast fan house (E) are three fans having capacities of 6,700, 3,500 and 6,700 cu. ft. per min. respectively, all at 26-in. w.g. The cold-blast cupolas are denoted by F, one is used for common irons and has a capacity of 10 tons per hr., the other—used for special irons—has a capacity of six tons per hour, both are of the company's own manufacture. Intermittent tapping of the cupolas into pouring ladles is the usual practice. There are two hot-blast cupolas (G), each of 6 tons per hr. capacity and with a blast temperature of approximately 500 deg. C. Intermittent tapping is carried out into a receiver. The water coolers in the melting zone of the cupolas and the water-cooled rings for supporting the cast-iron bricks at the gas take-off point were manufactured by the company themselves but the radiation recuperator shown at H, is a Schack model capable of heating 2,100 cu. ft. per min. of air to 500 deg. C.

Charging Casting and Core Conveyors

The overhead chain conveyor for cupola-charging, by Crescent Webb (at J Fig. 1, and also shown in Fig. 2) carries 22 buckets, each having a scale weigher with its dial appropriately marked for the type of charge. The doors of the skips automatically open on the firing platform and the charge is dumped into a Lecq gear-operated pneumatic charger for entry into the cupola (Fig. 3). The maximum capacity of the cupola-charging conveyor is 22 tons per hr. and its speed is 14 ft. per min. The charging bins (K) are arranged parallel to the loading line of the cupola-charging conveyor and have separate compartments for various materials, pig-iron, scrap, coke and limestone. A storage space is arranged at the rear of each compartment and this is used for reserve stock, a provision which serves as a " buffer " in the event of a crane or magnet breakdown.

The continuous casting conveyor (L, and also Fig. 4) is of the pallet type and has a speed of 14 ft. per min.; it is positioned with the moulding machines arranged at one side. Snap-flask moulds and moulding boxes are placed on allotted passing pallets and pouring takes place adjacent to the cupolas. The conveyor handles betwen 70 and 80 tons of castings each week. Sand distribution for the continuous casting plant is denoted by M. Return sand from the Ty-Rock screens and shake-out grid is conveyed to Hum-mer screens and storage hoppers. New and returned sand is milled, aerated and distributed by a push-plate conveyor to the moulding machines. The capacity of the company's sand-handling system is 30 tons per hour, each operation being controlled by means of push-buttons on a sequence control panel. N, denotes

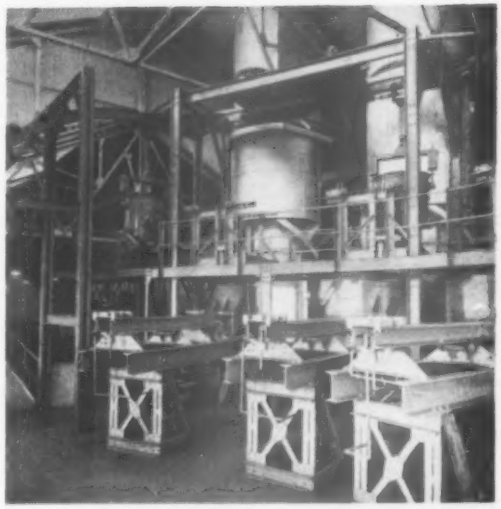


FIG. 2.—*View of the charging platform showing the chain conveyor and buckets serving the hot-blast cupolas. At each furnace, selected buckets can be discharged automatically into a secondary hopper, which is later pushed into the furnace to deliver its complete charge.*

the flask knockout and screen, and the vibrating chute and moulding-box push-off are shown at O. Castings are fed from the Ty-Rock screen shakeout into a No. F44 Syntron vibrating chute. Pneumatic push-off cylinders transfer the moulding boxes from the casting conveyor to a F33 Syntron box shaker, and sand and castings fall through the box on to a F44 Syntron vibrating grid.

The core-delivery conveyor is shown at P. This is used for transporting small cores from the coreshop to the moulding-machine operators on the continuous casting plant. The castings cooling conveyor is denoted by Q and is also shown in Fig. 6. On this, small hot castings are loaded into buckets inside the foundry and transported by overhead chain conveyor to an open-sided covered building, housing four levels of conveyor track making a total of approximately 1,276 ft. The tracks return to the foundry where the cold castings are unloaded. When fully loaded, the time to complete the circuit can be controlled between 2 and 5 hours. The dust-extraction plant at R, consists of a Tilghman dust-arrester coupled to a Wheelabrator and a Raymond No. 8L fan which extracts dust from the grinders and collects it in a 7-ft. dia. cyclone. The shotblast plant (S) is a Tilghman dual-table Wheelabrator with revolving tables. Shot blasted from impeller wheels on to the castings, is later reclaimed, elevated and screened to extract the dust.

The continuous pallet-type fettling conveyor (T) was manufactured by International Combustion for carrying small castings. In the company's stock-

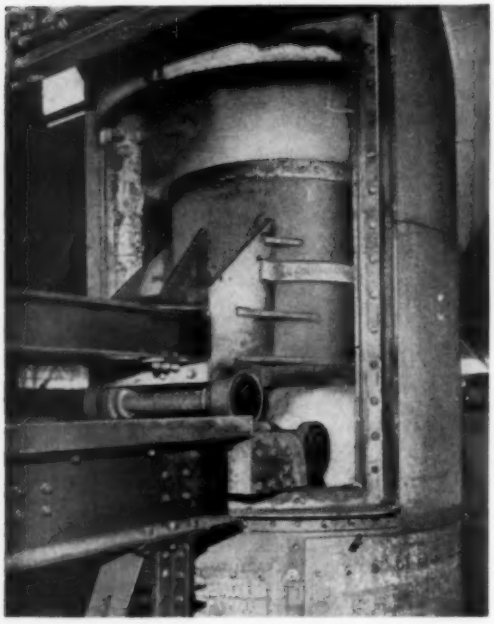


FIG. 3.—*Charge hopper being pushed into the furnace. The front bogie-wheels run over the lip of the pusher mechanism so that the contents are discharged vertically. On returning to ground level, the doors of the weigh-hoppers are closed and locked automatically by a skid mechanism.*

coremakers' benches and has a speed of 18 ft. per min. Sand buckets and trays are alternated along the conveyor for carrying mixed core sand to the coremakers or finished cores to the corestoves. Here there are two more vertical-type continuous core-drying stoves (W), each fired by one No. 1 Riley Stoker. The amount of coal burned in the Stoker is between ½ and ¾ cwt. per hour. Cores requiring 45-min. baking time are loaded at the front, travel once through the stove (which reaches a temperature of 230 deg. C.) and are unloaded at the rear of the stoves. In the hot-blast fan house (X), two fans each having a capacity of 3,500 cu. ft. per min. at 40-in. w.g. are installed, one being used as a standby unit.

Melting Control

The control panel for the cupola charging machines is shown at Y and is so positioned as to give the operator a clear view of all the cupolas. As the filled buckets pass along in front of the cupolas, the operator selects the one required, discharges its contents into the charging bucket and then delivers this into the cupolas as needed.

The electricity sub-station for the 5-ton Birlec furnace is shown at Z, and includes a reactor, transformer, water-control cubicle, capacitator banks and bus-bar connections. The 300-kw. 5-ton capacity low-frequency electric furnace was manufactured and installed by Birlec, Limited, and is shown at AA on the plan. The furnace is tilted for pouring by hydraulic rams, one on each side of the body. These are supplied with fluid by a vane-type pump controlled by a valve mounted on the control-stand on the furnace platform. The electrical equipment is mounted at the rear of the furnace. This

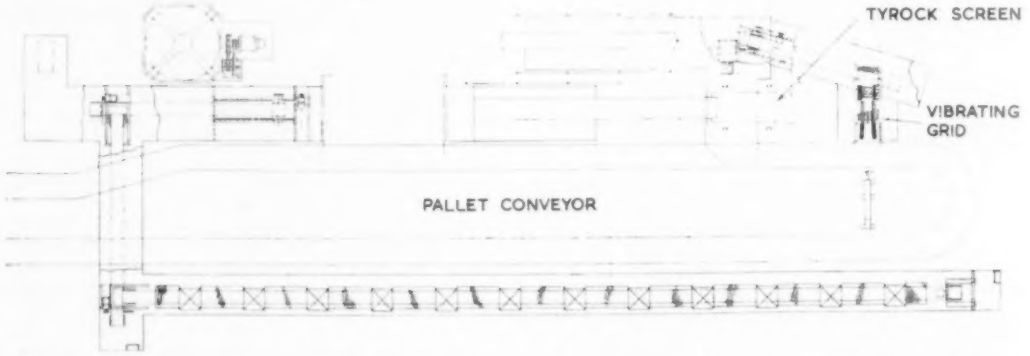


FIG. 4.—*Line plan of the continuous casting plant and that for the treatment, distribution and subsequent recovery of sand for re-use. New and returned sand is milled, elevated and distributed by push-plate conveyor to the moulding machines. The plant includes a central shakeout grid, Ty-Rock and Hum-mer screens and storage hoppers.*

yard, a 5-ton overhead travelling crane (U) with a 30-in. lifting magnet is used for unloading pig-iron from wagons and loading the charging bins. V, in Fig. 1 denotes the position of the overhead core-conveyor (also Fig. 5) which is arranged over the

furnace is mainly concerned with the production of s.-g. iron and a special inoculating "room" is arranged at BB. Here, a ladle containing molten iron is wheeled into the room, a magnesium canister is immersed and the ladle sealed by pneumatic

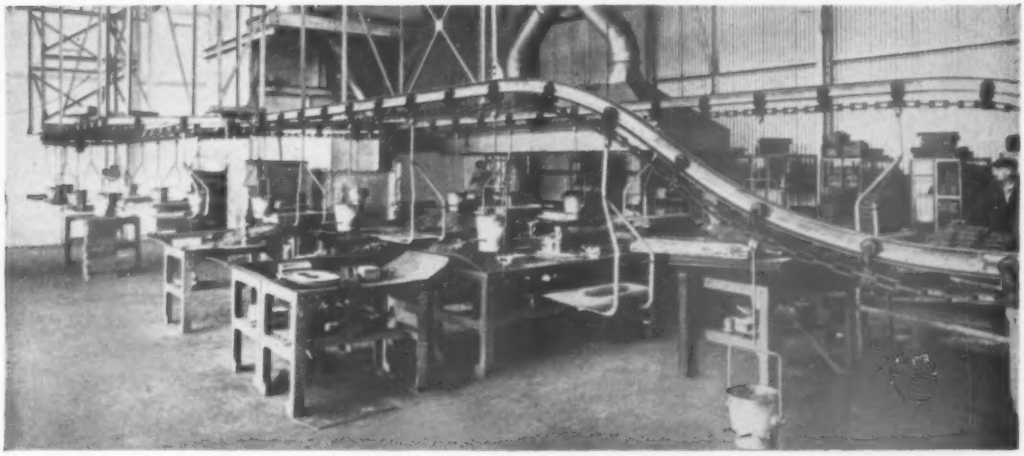


FIG. 5.—*View of one of International Combustion's coreshops, showing the overhead conveyor arranged over the coremakers' benches. Sand buckets and trays are arranged alternately on the conveyor for carrying mixed coresand to the coremakers or finished cores to the stoves.*

operation. The room is also equipped with a pre-set timing panel, observation window and gas-drying equipment all manufactured by International Combustion, Limited. A storage platform is arranged adjacent to the furnace (CC) and this is used for accommodating the various metals. An annealing oven (DD) is used for the heat-treatment of s.-g. iron castings. This is 15 by 18 by 7-ft. 6-in. high and is gas fired and heat controlled. Castings are loaded on to a bogie and hauled inside the oven by an overhead crane.

The laboratory (EE) is situated above and behind the Birlec furnace, so situated that the furnace can be viewed in action at all times and samples can be analyzed without delay. Amongst the laboratory equipment is apparatus for the rapid analysis of various irons.

Heavy-duty square-mesh grids used for shaking out moulds and vibrated with Syntron F44 vibrating units are shown at FF. The intensity of the vibration can be varied to suit the moulds being dealt with. The "H"-tube moulding plant (GG) was also manufactured by I.C., Limited; HH on the plan denotes the shotblast room which is 15 by 6 by 8 ft. high. Shot is ejected by direct air-pressure through nozzles and is reclaimed, elevated and screened before re-use. The dust arrester for the plant's exhausting room is coupled to an underground hopper.

Hydroblast and Other Systems

The Hydroblast plant (JJ) is housed in an 18 by 19½ by 15-ft. high room, with grid flooring and a power-operated turntable. Sand, cores, etc., are removed from castings by a water-and-sand gun operating at high-pressure, which is remote-controlled by an operator outside the room. KK, denotes the light floor-moulding area and LL, the heavy roller-conveyor systems. Heavy machine-made box moulds are poured on roller-conveyors and shaken out over a vibrating grid with a pneumatic shaker suspended on an electric hoist block. The conveyor system is of I.C. manufacture and the weekly output of castings on each system is of the order of about 30 to 35 tons. An 8-in. Jackman moulding machine (MM) is used for moulding economizer tubes. The sand-distribution plant for No. 2 and No. 3 bay is shown at NN. Return sand from the knockouts is conveyed to storage hoppers. New sand and returned sand is milled, aerated, disintegrated and distributed by an overhead belt conveyor to Syntron F44 feeders situated over the moulding machines. Coal-dust for mixing in the facing sand is powdered in a "0000" Raymond pulverizer. The capacity of the sand-handling system is 30 tons per hr.

The company's shell-moulding plant (PP) is a small experimental unit manufactured domestically and consisting of a mixer, heater, dump-box and stripping mechanism. Moulds are poured horizontally in sand-filled trays. In the compressor house (QQ) are four compressors feeding two air-receivers. Two of the compressors are each driven by 85-h.p. motors, one by a 67-h.p. motor and one by a 100-h.p. motor. At RR is shown the air-swept underground tunnel with down-draft extraction at the vibrating grid shakeouts.

PROGRESS REPORTS

Charging Conveyor

Following the article published in the FOUNDRY TRADE JOURNAL of April 11, 1957, describing the developments of cupola charging at International Combustion's foundry, reports are now to hand of modifications and maintenance of the plant.

FIG. 6.—*Section of the castings-cooling conveyor—also of the chain/pendulum-bucket type—at the point where scrap is automatically discharged for transfer to the melt stockyard.*

It has now been in service since 1952, a period of eight years' continuous operation, having handled 112,000 tons total or 14,000 tons per year.

This plant was a prototype installation and, as was expected, modifications were necessary after the plant was commissioned. The charging conveyor, consisting of approximately 415 ft. of telpher track with Crescent Webb drop-forged chain, carries 22 buckets, each having a scale-weigher and a total nominal loading of 11 tons with a capacity of 22 tons per hr. After passing the stock bins at ground level, the conveyor rises a total of 30 ft. by the side of the foundry, enters into the charging bay, passes in front of the cupolas and then leaves the bay, runs down the side of the foundry and completes the circuit. Within a few months of being put into operation, it was noticed that excessive wear was taking place on one side of the chain—the side which came into contact with the chain turns. On investigation, it was found by the firm's engineers that on the rising side of the conveyor, which carries the full buckets, more loading on the chain occurred than was anticipated, consequently greater stresses were imposed on the horizontal roller-turns. The horizontal bends, which consisted of a number of close-pitched rollers, were so arranged to form a 20 deg. bend and served to guide the chain (Fig. 7).

Thus, it can be seen now that all the loading in the chain was transferred to points where contact was made between the chain and rollers. In other words, point loading occurred, thus causing flattening on the chain. To overcome this, the roller turns were replaced by caterpillar idler-chain bends (see Fig. 8), the object being to increase the bearing area and instead of point loading, the complete side of each link of the chain was thus placed in contact with the idler-chain bend which spread the load over the whole of its radius.

Wear and Tear

During this period, it was noticed that the two driving units of the charging conveyor chain were varying in speed, consequently most of the chain pull was being taken on one drive. Theoretically when the driving unit is overloaded the unit is allowed to "float" and eventually operates knock-off limits, tripping the drive motors. In practice, however, before the limits had time to trip, the conveyor chain over-road the caterpillar chain forcing the back-up-bar (a device to prevent the conveyor chain from disengaging from the chain drive) to distort and fracture. This bar was therefore modified and stiffened without any further trouble being encountered.

The plant had been in commission for approximately 12 months when for no apparent reason, the conveyor chain links began to fracture and, more seriously, complete breakage took place. On examining the chain, several links were found to be bent and metallurgical investigation showed the breakages were caused by bending fatigue. Watching the conveyor in operation with greater than usual care, it was noticed that when the chain was travelling on the vertical bends, it had a tendency to follow the same radius as the conveyor track instead of a straight line between two supporting rollers. Experimenting independently on a spare piece of chain, it was found there was insufficient movement between the chain pins and links to allow the chain to take a straight path between the rollers, consequently the links were bending. To eliminate any further breaking, additional rollers were therefore fitted, halving the pitch of the supporting chain rollers and guiding the chain on the curve in a series of shorter straight lines. This remedy proved completely efficacious and further breakage was prevented.

Following this, with the exception of minor maintenance, the plant continued to run for a period of approximately five years, when it became necessary to renew some of the vertical track bends due to wear and preen by the chain rollers, which run on the bottom flange of an I-section rolled-steel joint. Having difficulty in bending new rolled-steel joists, the firm's maintenance department fabricated a new section, incorporating a thicker bottom flange and up to the time of going to press, this has shown very little wear.

Synchronization

Both driving units of the chain conveyor, each having a slip-ring motor, were controlled by a time-lag switch which, on initial starting, ran the motors for a few seconds on slow speed until the conveyor gained momentum, and then switched over to the required running speed. In practice, the motors were not synchronous. This had the effect of causing the faster-running unit to take the loading in the conveyor chain and at times of trying to drive the slower-running unit. Under normal running conditions, as stated earlier, the drive units are allowed to "float" and any excessive loading causes the units to operate knock-off overload release switches. Under certain conditions, however, before the knock-off switches had time to operate, the conveyor chain loading was transferred to the driving-unit gears, usually stripping the teeth of the spur wheels. A new modification was thus made to overcome the varying speed of the motors. The time lags were by-passed and the motors put direct on line, bringing the conveyor speed up to a maximum and though the motors are in this way temporarily overloaded, it has not been found detrimental to the operation of the plant or its life.

Still dealing with the charging plant, shortly after fitting the weigh-scales to the individual charge buckets, it was found that when the pig-iron was being loaded into the buckets, the weight of the iron caused sudden movement in the pointer mechanism, causing stripping of the pinions or upsetting the gearing of the weigher, and giving incorrect readings. This was overcome by fitting oil-filled dash-pots to the weigh mechanisms which took the initial shock of the load and damped down oscillations of the scale pointers. Apart from renewing valves, valve seatings and sealing rings of the cupola pneumatic chargers, further maintenance at this unit has not been necessary.

Cooling Conveyor

The castings cooling conveyor, Fig. 1 and Fig. 6, is another Crescent Webb installation; it has now been in commission for six years. Small hot castings are loaded into buckets inside the foundry and then immediately transported by the chain conveyor to an open-sided building which houses four levels of conveyor track, making a total of approximately 1,300 ft. The track then returns inside the foundry where the cold castings are unloaded. When fully loaded with approximately 40 tons of castings, the time to complete the circuit can be controlled between two and five hours, the drive being by two floating caterpillar-drives each consisting of two 2-h.p. slip-ring motors fitted with a variable-speed box and a gearbox. Apart from normal maintenance work on the driving units, very little expense has been incurred on this conveyor during its whole life to date.

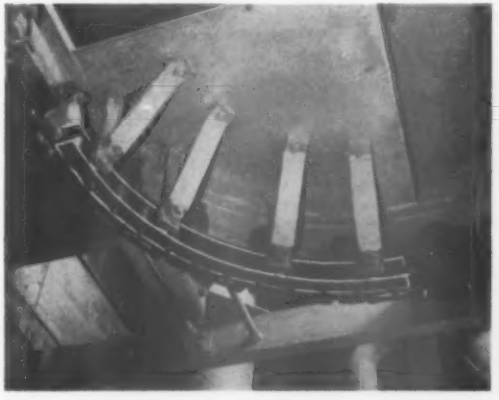
Ventilation for S.-g. Iron Treatment

The Birlec mains-frequency induction furnace for producing International Combustion's spheroidal-graphite iron (an account of which was published in the JOURNAL of April 11, 1957) is now in full production. For small quantities of this iron, the open-ladle treatment with magnesium No. I.M. alloy is employed. It has been found, however, that this method can produce a vast amount of fume and smoke which normally might circulate throughout the foundry. To overcome this difficulty, a very efficient extraction unit has been fitted, as shown in Fig. 9. It consists of a 10-h.p. 1,200 r.p.m. motor and a 28-in. dia. impeller fan (removed from an obsolete works plant), the inlet ducting of which is located adjacent to the ladle used for the magnesium treatment. It really is most impressive to see how well this unit takes all fumes out of the shop.

HYDROBLAST PLANT

The Hydroblast system for the cleaning of large castings (mentioned briefly in the early pages of this article) was installed in the Derby Works of International Combustion, Limited, in March, 1958, the main contractors being Pneulec, Limited, of Smethwick, who have installed a large number of plants at various foundries both in the UK and overseas. The system uses a high-pressure water-jet of 1,800 lb. per sq. in. into which is fed a stream of sand to act as an abrasive. This is quite effective in removing all sand, etc., from the castings, but since the system is wet and because of the type of pump required to give the high pressure, it is essential that a feed of clean water be used. Sometimes this is readily available from a works main supply, but there are times when this cannot be obtained and water clarification must be carried out. At the company's Derby Works, the used water cannot be permitted to run to waste at the consumption rate of the Hydroblast system and also the type of material which would then go down the

FIG. 7.—*Original arrangement of close-pitched rollers on the bends of the heavy-duty chain conveyor used for cupola charging.*



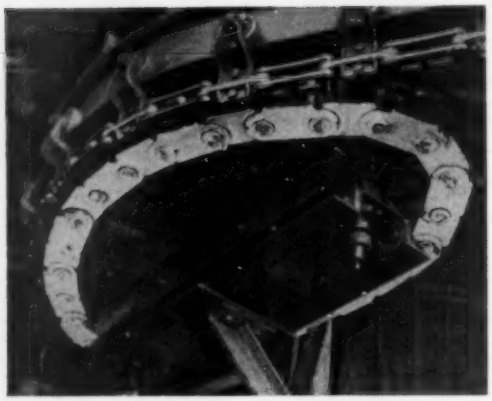


FIG. 8.—*Caterpillar idler-chain bend-system fitted to the charging conveyor to replace the close-pitched roller unit shown in Fig. 7.*

drain could not be classed as a normal trade effluent. Since International Combustion themselves manufacture most items of equipment which are used in water-clarification plants at washeries, they undertook to handle this side of the plant. This has been done and as a result, they are in a position to offer advice on water clarification to assist other users of similar plant.

Plant Details

The cleaning unit of the Hydroblast plant comprises an open-topped blast chamber which is approximately 19-ft. sq., a total height of 15 ft., with a 13-ft. 6-in. door opening, a power-operated turntable located at floor level in the centre of the chamber and an externally-operated high-pressure gun. The capacity of the gun is 36 gall. per min. at the pressure of 1,800 lb. per sq. in. previously quoted. It is mounted on a carriage inside the chamber and has horizontal and vertical electrically-controlled movements of 13 and 6 ft. respectively; the gun also swivels on the carriage and is hydraulically controlled. The two control levers for remotely controlling these movements are fitted into a box located outside the chamber and which traverses the length of the chamber. To permit the operator to observe and direct the water jet, observation windows, themselves fitted with cleaning sprays, are arranged along the length of the chamber, the operator moving along pushing the control box with him to the most convenient observation window to carry out his operations.

Operation

The loaded bogie carrying the castings to be cleaned is pushed along a standard-gauge rail track on to the turntable and the chamber of the Hydroblast is then closed. The high-pressure jet is directed against the castings, the material removed being washed through the perforated floor, flowing down a sloping launder where it is discharged over a Hum-mer screen to remove oversize material, which is discharged into a refuse skip. The underflow from the screen, consisting of sand, water and various other materials, passes into a sump from which it is pumped by a Vacseal pump up to an International Combustion classifier. There, the fines—containing the deleterious material—are separated from the sand, the latter being automatically discharged into the blast tank for further use through the gun. The excess sand not required by the gun overflows into a de-watering tank from which it is dicharged, then dried for re-use in the company's foundry.

Water System

The overflow from the classifier containing the fine suspended material flows by gravity into a large-diameter Hardinge thickening tank, where the solids contained in the incoming slurry settle to the bottom and are automatically raked to the central discharge point by a power-operated raking mechanism, where the material is pumped by means of a Vacseal pump to a skip (or direct to the refuse dump, if site conditions are favourable). The clarified water overflows along a weir edge extending round the whole circumference at the top of the thickening tank into a launder, along with it flows into a collecting tank. The latter supplies the necessary diluting water to the sand sump-pump and the blast-sand tank, also the booster pump which operates at approximately 35 lb. per sq. in. The latter supplies the water necessary for agitating the sand in the sand blast-tank, for cleaning the observation windows of the chamber and releasing any choking of pipes and valves wherever necessary. The remaining clarified water not used for these purposes overflows into a surge tank from which the high-pressure ram-pump feeding the gun takes its supply. The tank make-up water from the town's main—which is quite small in quantity—is introduced into this tank.

Sand required for blasting purposes is taken from the sand blast-tank by the following means: As the high-pressure reaches the gun, it passes through Venturi nozzles, thus creating a vacuum which sucks the sand into its high-pressure system. This mixture of sand and water serves thoroughly to scour any material adhering to the castings to be cleaned.

Chemical Treatment

It was originally intended to operate the Hydroblast by using water from the thickener overflow, but it was found necessary to flocculate the thickener feed to give a good clean overflow. Until this was done, the company could not operate a closed-circuit water system because of possible damage to the high-pressure pump. The selection of the correct flocculants was a difficult matter and a large number of different reagents was tried. The final selection—governed by the necessity to treat reactive material from core-sand,

which proved quite an awkward problem—is to add hydrated lime into the blast chamber so that it can be washed down by the water spray. This controls the pH value and at the same time gives a flocculation effect to the clay from the cores. Aluminium sulphate is added into the main sump in a 5 per cent. solution, and a complex organic resin (Separan) added as a 0.1 per cent. solution to the overflow of the classifier. This is then passed into the thickener *via* a suitably-designed feed well.

As a result of chemical treatment, the thickener overflow contained solids to the extent of 30 to 40 parts per million, but this was not considered low enough. This overflow is now passed through a limestone bed consisting of foundry limestone, crushed to approximately $\frac{1}{2}$ in. size, with the material less than $\frac{1}{4}$-in. removed by screening. From this bed, the water is "brightened" to give a total suspended solids of not more than 5 parts per million as a general rule. This enabels a closed circuit to operate. The complete clarification plant has improved to give an average thickener overflow of 20 to 25 ppm, with clean water down to less than 2 ppm from the limestone bed. The limestone tank is simple in construction, its charge is readily available, it has a useful life up to about two months, and replacement is easily carried out.

The principal advantage of the thickener tank is that it is, in effect, a clean-water reservoir and surges in plant operation can be easily absorbed. Most effluent plants suffer from small "hold-up" capacity and the company considers that the use of the thickener tank is ideal for providing reserves for this purpose. Also, the settled solids are of high specific-gravity and the Hardinge system is well suited to give a regular sludge bed in the thickener.

Service Comments

Considering the heavy duty under which the water-clarification plant of the Hydroblast operates, it has worked extremely well, giving completely clarified water for re-use on the high-pressure pump. The circuit has been completely closed, the only water loss being that by evaporation and that associated with the refuse from the plant. The flocculation system has been so efficient that for future plant, the firm would recommend a smaller size of settling vessel, thus economizing in floor-space. Yet a further modification suggested for a future plant would be the use of a "hydrocyclone" for sand classification.

Throughout the period of operation, maintenance of the Hydroblast and ancillary plant has been extremely low, the Vacseal slurry pumps and high-pressure water pump requiring only routine inspection. These units are an integral part of the plant, being designed for the rigorous conditions involved, and have proved beyond any doubt to be ideal for the job.

Acknowledgment

It remains for the writer to acknowledge permission from the directors of International Combustion, Limited, to print this account, to compliment the firm for its extremely open-handed attitude in making maintenance and modification details available and to thank the company's staff for help in its compilation and illustration. It is taken as a compliment to the JOURNAL that such information is so readily put at the disposal of readers.

FIG. 9.—*Fume extraction, following ladle treatment for the production of spheroidal-graphite iron.*

Iron and Steel Industry in Nigeria ?

Two special reports on the potential for establishing an iron and steel industry in Nigeria—and on possible West African markets for such an industry—are now available from the Commercial Counsellor, Nigeria House, 9, Northumberland Avenue, London, W.C.2. The reports, commissioned by the Federal Government of Nigeria, are the results of surveys carried out by the West African and marketing development companies of the Production-Engineering group and their associates, Campbell, Gifford & Morton, Limited.

The first report is in the form of a compendium giving information on local sources of ore, coal, limestone and other raw materials and energy for projected operations. The second report is a detailed evaluation of West African markets for all types of iron and steel products. Also included is a survey of availability and types of ferrous scrap in Nigeria. Both reports are being released in a single volume.

In view of the ample resources of the country and the expanding market, the Governments of the Federation of Nigeria hope to see a large-scale iron and steel industry established as soon as possible. They also hope that private enterprise will provide not only management and technical "know-how," but will also be prepared to invest in the project. Companies interested in this industry are asked to submit detailed proposals to the Federal Ministry of Commerce and Industry, Lagos, not later than December of this year.

NSMP Activities

Overseas Visitors Welcomed at Annual Gathering.

Visit of Italian Patternmakers

As announced in the JOURNAL of March 23, arrangements were made by the National Society of Master Patternmakers for a return visit of Italian patternmakers from May 29 to June 4. A total of 20 Italian visitors (some with their wives) arrived in London on May 29 and were met at Victoria Station by the president and other Council members of the Society. After spending the night in London, the party travelled to Leicester to tour the Green Lane Works of Wadkin, Limited, where they were welcomed by Mr. S. Radcliffe, the company's joint managing director. The visitors were particularly impressed by the latest model of the firm's pattern miller, a number of which have already been sold to the larger Italian concerns.

After luncheon, the party travelled by coach to Leamington Spa for a visit to Leamington Pattern Making Company, Limited (of which the new NSMP president is a principal), returning by coach to London. On Wednesday, a visit was arranged to the National Science Museum, Kensington, followed by luncheon at the Charing Cross Hotel, attended also by NSMP members and their ladies, and further works visits in the London area to B. Levy & Company (Patterns), Limited, and R. J. Frankiss (Patterns), Limited. The whole of the Thursday was spent in the Birmingham area, where the Italian patternmakers visited Crockett Lowe, Limited, in the morning and, after luncheon at the Queen's Hotel, Robinson & Knee, Limited, and Wright & Platt, Limited, in the afternoon. Again, the party was accompanied by local members of the Society and sightseeing trips were organized for the ladies.

For the Friday, a full-day visit was arranged to the Thames foundry of the Ford Motor Company, Limited, this being open also to all members of the NSMP. The party (numbering 60 in all) left Charing Cross Pier at 11 a.m. and after lunching on board, arrived at Dagenham at 1 p.m. The party left Dagenham at 3.45 p.m. and arrived back at Charing Cross Pier at 5.30 p.m. after a most enjoyable outing.

The final day of the visit of the Italian patternmakers was left free for shopping and sightseeing, but in the evening, they and their ladies were guests at the Society's annual dinner/dance.

Annual Dinner/Dance

The seventh annual dinner/dance of the Society was held at the Waldorf Hotel, London, on June 3, with Mr. R. W. Mousley presiding. The menu card was most attractive and printed in both English and Italian, in honour of the Italian patternmakers and their ladies. After the Loyal Toast, Mr. E. C. Rowen proposed "The Society and the President" to which Mr. R. W. Mousley responded. He said that the Society was flourishing and members could rely on him to do his best to maintain and accelerate the progress shown during the seven years of the Society's existence. Mr. J. J. Harvey proposed the toast of "The Guests" and the response was given by Mr. Maurizio Garino, the leader of the Italian party. During the course of his remarks, Mr. Garino expressed his deep appreciation of the cordial and courteous reception accorded to him and his colleagues and to the management of the works who had opened their doors to them. He also thanked Mr. V. C. Faulkner, the editorial director of the FOUNDRY TRADE JOURNAL for his valuable contribution to the founding of the Society and for his activity in furthering international co-operation. He hoped there might soon be established a Patternmakers' Society in Italy. He also paid tribute to

Part of the contingent of Italian patternmakers and their wives, who visited this country (May 29 to June 4), photographed at the annual dinner of the National Society of Master Patternmakers in London on June 3.

Other happy scenes at the annual social gathering of the Patternmakers in London: (a) (left to right) Mrs. and Mr. R. W. Mousley (the new president) welcoming Mrs. and Mr. B. Levy (past-president); (b) the retiring president, Mr. E. C. Rowen, presenting a bouquet to Mrs. Mousley (also in the picture are Mr. and Mrs. V. C. Faulkner), and (c) Mr. and Mrs. Mousley photographed on their own.

the work being done by Mr. Lo Pinto, the secretary of the *Associazone Italiana di Metallurgia*, to this end. Mr. Garino closed his remarks by saying that he hoped his hosts would visit his country again and then proposed that his compatriots should drink a toast to the National Society of Master Patternmakers.

During the function, the chairman presented the Levy Silver Medal to Mr. V. C. Faulkner who made suitable reply, and the remainder of the evening was given over to dancing, a finalé being provided by a male quartet singing popular songs, specially invited by the president.

Annual General Meeting

The seventh annual general meeting of the National Society of Master Patternmakers was held on June 3 at the Waldorf Hotel, London, with Mr. E. C. Rowen (the retiring president) in the chair. There was an encouraging attendance of members at the meeting, due in some measure to the fact that the Society had the day previous visited the Dagenham works of the Ford Motor Company, Limited, a visit which had attracted some 60 participants.

After the minutes of the previous annual general meeting had been adopted, the chairman gave his annual report on the year's activities. During the course of his remarks, he said that it had been a very full year of activity. In the late summer of 1960, members had paid a very successful visit to Italy, touring patternshops and meeting their Italian counterparts, and that evening, the Society would be entertaining their Italian friends to dinner, as the last engagement before their return home after a week in the United Kingdom.

In the period under review, the chairman said several works visits and technical meetings had been carried through and, on the whole, had been well supported. He felt that one of the most important had been the visit to Glasgow, the objective of which was to gain the interest and membership of Scottish master patternmakers in the Society. During the year also, the Society had co-operated with one of the leading makers of contraction rules in drawing up an up-to-date schedule of the con-

NSMP Activities

tractions now in general use, and a revised catalogue of rules would shortly be issued which eliminated much of the duplication of patternmakers' contractions which had occurred in the past.

The chairman stated that six new members had been admitted during the past year, bringing membership of the Society to 82 firms. Finally, he thanked members of Council, all of whom he said had given generously of their valuable time in the service of their fellows.

Vote of Thanks

In proposing a vote of thanks to the chairman for his report and for the onerous tasks he had undertaken during his year of office, Mr. L. Brown (past-president) stressed his large share in the successful outcome of last autumn's visit to Italy and the arrangements made and carried through for the reception of the Italian patternmakers during the past week. Mr. W. D. Hartley seconded the proposal and in his remarks, referred to the inaugural meeting held in Scotland which had undoubtedly, he said, been a promising effort for attracting members from North of the Border. The vote of thanks was accorded with hearty and sincere approbation.

The secretary then presented the balance sheet for the year which disclosed a healthy financial position. It was approved on the proposition of Mr. B. Levy, seconded by Mr. Mebberson.

Election of Officers

The proposal from the chair that Mr. R. W. Mousley be elected president for the forthcoming year was enthusiastically endorsed and this was duly carried out by the handing over of the badge of office. The election of Mr. J. J. Harvey as vice-president was cordially received. Newcomers elected to the Council of the Society were Mr. Mebberson (of Rugby) and Mr. R. J. Frankiss (of Richmond, Surrey). Mr. Whitehouse of Coventry was re-elected as honorary auditor.

Other Business

Under " any other business," members very freely expressed constructive views for maintaining the attractiveness of the programme of activities of the Society. Amongst suggestions put forward were a visit to an ornamental-glass factory, the visit to the Paris Motor Show (already arranged), a visit to a selected annual national exhibition not hitherto seen, and a visit to an International Machine-tool Exhibition to be held in Brussels. These, and other suggestions, will be considered by the Council at its next meeting.

THE SECOND INTERNATIONAL CONFERENCE ON STRESS ANALYSIS is to be held at 1 Ecole Superieure d'Aeronautiques, Boulevard Victor, Paris 15, during the period April 10 to 14, 1962. Details are available from the Joint British Committee for Stress Analysis, 1, Birdcage Walk, Westminster, London, S.W.1.

Film Reviews

Fashioned in Steel

Casting and forging in a big way is the business of the Darlington Forge, Limited, a wholly-owned subsidiary of the English Steel Corporation, Limited, Sheffield. This is made very clear in this 38 minute, 16 mm. colour film of the company's activities. From the company's name one might expect forging to monopolize the film but the shots of the progressing of large intricate castings from the patternshop to the machine-shop soon dispel this notion.

A brief historical sequence, which shows the original forge on the Ordnance Survey Map of 1855, illustrates the close association of the company with the shipbuilding industry of the Tyne, the Wear and the Tees, and indicates the main extensions to the plant.

The company was acquired by the English Steel Corporation, in 1930, but continued its policy of specialization in " tailor-made " components. One of the many examples shown in the film is of a complicated cast-steel sternframe for a 65,000-ton tanker—this is seen being assembled into the tanker and the process is explained with the use of a model. All the various stages of manufacture are shown, starting with the wooden pattern, the moulding and core-making processes, the pouring of the steel, the fettling operation and, finally, the machining of the finished casting.

Cast and forged shaft brackets for multiple-screw ships are introduced in later sequences and shots of the more spectacular aspects of the intricate forging operations are shown. Propeller shafts and parts for Doxford oil engines are also included amongst the shots of forgings for shipbuilding.

Components for the iron and steel industry are represented by cast-steel bells and hoppers for blast furnaces, cast and forged-steel rolls for hot rolling mills and composite back-up rolls used in cold rolling. The closing shots show some impressive examples of heavy plant in which Darlington Forge castings and forgings are used—a blast furnace, hot and cold continuous reduction mills, an extrusion and a bending press.

The film, which was produced by the ESC Film Unit, finally ends with the launching of the Canadian Pacific " Empress of Canada " at the Walker Yard (Newcastle) of Vickers-Armstrongs, Limited.

" O for Oxygen "; made by World Wide Pictures, Limited, for the British Oxygen Company, Limited, Bridgewater House, St. James's, London, S.W.1; photographed in Eastman colour and printed by Technicolor, running time 23 min.

This film has been made to mark the occasion of the company's 75th anniversary this year. It shows how from Priestley's discovery of oxygen in 1774 has stemmed a world-wide use for oxygen and other industrial gases in industry, medicine, aviation and scientific development. It also illustrates how the various ingredients of the air are being used to make steel more efficiently, cut ships' plates, weld metals, to send up rockets and save lives. The film is amongst the 15 selected by the Federation of British Industries for the Second International Festival of Industrial Films at Turin, June 25 to 28. Copies of the film in 16 mm. and 35 mm. will soon be available on free loan from BOC to schools, colleges, and similar organizations.

Equipment and Supplies

Tractor Shovel

During a visit of the Press to the Wednesfield division of Yale & Towne Manufacturing Company, recently, the company's new Trojan "204" tractor shovel was announced. The new model has a four-wheel drive and is, with modifications, a new version of the company's model 154 which was introduced early in 1960. The "204" has a lifting capacity of 12,000 lb. and is fitted with a Leyland UE 350 engine. Developed from model 154, it has an additional counterweight added of 1,000 lb., and is fitted with dump cylinders of larger size to give greater breakout force, and has a faster loading cycle than the former model. Reverse-curve safety-arms allow maximum safety and 360 deg. visibility.

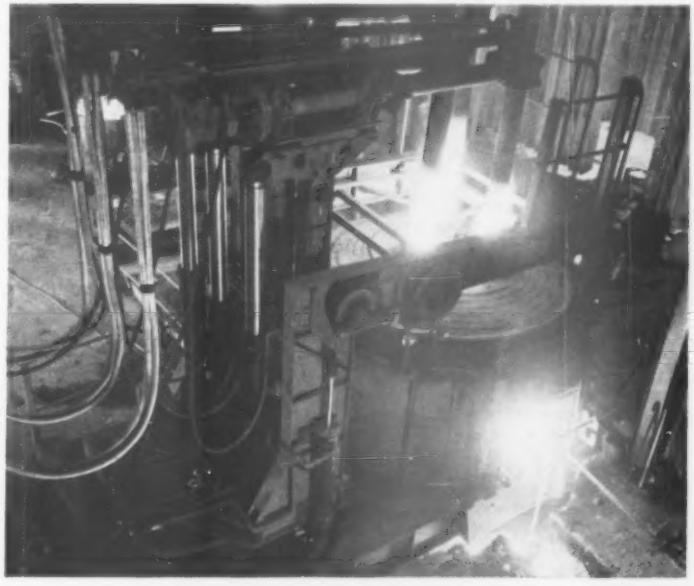
Oscillating Hotplate

For the simultaneous heating and stirring of liquids at a constant temperature for analytical and preparative work in laboratories, the Griffin & George group, Ealing Road, Alperton, Middlesex, announce production of an oscillating hotplate which will accommodate 28 250-ml. or 18 400-ml. beakers and which oscillates in a circular orbit of ½ in. The unit is heated by two steel-sheathed heating elements cast in the shape of an extended S, the heating being governed by a Simmerstat regulator which permits a range of hotplate surface temperatures for most heating operations in general analysis up to a temperature of 350 deg. C. The hotplate rating is 2,000 w. for a 240-v. supply. The oscillator is driven by a gear-reduced motor with tropicalized winding, an eccentric shaft moving the hotplate.

Electric-arc Furnace for Knete Castings

The photograph shows a recent Metalectric* 1½-ton capacity direct-arc melting furnace rated at 800kva. used in producing steel at Knete Castings, Limited, West Horndon, Essex. The furnace is arranged for top charging, using the swing bridge; in this arrangement the lid is lifted, swung to one side, thus exposing the whole of the furnace top. Thereby, the complete charge can be placed into the furnace in one quick operation.

It is claimed that the swing-bridge mechanism has many advantages. It is mounted on its own platform and not attached to the shell, therefore the furnace shell carries a minimum weight, consisting of only the roof ring, brickwork and economizers. The sides of the shell are not screened, providing free radiation over the whole surface; the latest hydraulic electrode control is fitted as a standard and the whole system is reliable and foolproof.



* Supplied by Metalectric Furnaces, Limited, Cornwall Road, Smethwick, Staffs.

Anti-moisture Treatment

Hellermann, Limited, Crawley, Sussex, announce the availability of their CRC 2.26 anti-corrosion and anti-moisture treatment for electrical and electronic equipment. The liquid is supplied in 16-oz. dispensers, 1- and 5-gall. cans and 55-gall. drums and the makers claim that it has the ability of penetrating pores, cracks or holes and displacing absorbed moisture, after which it forms a film to prevent further contamination. It is stated that this film does not become brittle or crack and is therefore a corrosion inhibitor for metallic surfaces. Another use put forward is that it can be used for restoring to operation, equipment which has been damaged by excessive exposure to moisture or by total immersion.

Magnetic Crack-detection: Southern Tools, Limited, 22-24, Upper Mulgrave Road, Cheam, Surrey, have introduced a range of magnetic inks and powders for magnetic crack-detection. The two inks available are black/grey, high-sensitivity and fluorescent, and are supplied in concentrated form in quantities to make 1 gall. (4½ litres). To prepare the inks, the container is gently warmed until the contents melt and then the contents are poured into a gallon of water with agitation. Additives in the concentrate ensure that specimens will not rust and that the ink will flow readily over slightly greasy surfaces. The powders are available in 1 lb. tins in black, grey, and copper red.

Lighting Controller: An automatic lighting controller which incorporates a cadmium-sulphide type of photoconductive cell is being manufactured and marketed by Electrical Distributors, 11 King Edward Buildings, Bury Old Road, Manchester 8. The controller, which switches on artificial light when the natural lighting fails and switches it off again when the natural lighting resumes, is adjustable for any level of daylight and is suitable for factory use. Its dimensions are 6 by 3 by 2 in. and weight 2 lb. 4 oz.

PERA Annual Report, 1960

In the annual report of the Council to the annual general meeting of the Production Engineering Research Association, held at Melton Mowbray on June 13, it was stated that membership of the Association had increased by 58 firms during the year, and the total membership was now 900.

During the year, 226 sponsored projects were completed and 218 new projects started, typical assignments including the measurement and analysis of sources of vibration in machine-tools and other equipment, automation projects ranging from the development of handling gear to complete systems for component manufacture, production-control procedures, method study and costing and budgetry control schemes. Design and development projects included a special-purpose copying lathe, operated by remote control, which reduces the time for machining irradiated uranium components from one day to 30 min. This lathe, manufactured by PERA, is now undergoing simulation trials before machining tests are carried out on irradiated material.

Research Work

In the field of general research, work on 34 general investigations was carried out during 1960 and 13 new research reports were issued. An investigation to determine the performance of several makes of cylindrical grinding machines was completed, and the final draft is almost completed on the investigation into types of surface, material and lubricant for machine-tool slideways. Other investigations completed concern *inter alia* vibration absorbers, relative machining properties of plain-carbon and free-machining steels, drilling cast iron, numerically-controlled machine-tools, and a progamme was approved and preliminary work commenced on machining practice.

To assist members in making the most effective use of research results and recommendations, approximately 1,500 visits were made by PERA liaison staff to works, in addition to visits made by the mobile demonstration unit.

During 1960, a new Machine Tool Industry Research Association was formed and PERA expects to collaborate very closely with this new organization. In the report, it was stated that satisfactory progress had been maintained on the construction of the Association's new research applications and technical services building, and it is expected that the building will be completed early in 1962. This will provide laboratories, model workshops and offices equipped to deal with the problems of the effective application of research results in industry, a multi-purpose hall for exhibitions, conferences, lectures, etc., and design and drawing offices.

Election of Officers

At the meeting Sir William Stanier, F.R.S., was re-elected president. Newly-elected members of Council were Mr. C. F. Barnard (Mirrlees, Bickerton & Day, Limited), Mr. C. G. H. Richardson (Ransome & Marles Bearing Company, Limited), Mr. J. R. Widdowson (Samuel Fox & Company, Limited), and Mr. A. J. Worster (Rover Company, Limited). The following retiring members were re-elected:—Mr. H. Gardner, Mr. G. L. Hack, Mr. A. Siddall, Mr. J. B. Stevenson and Mr. F. K. Lord. At a meeting of the Council following the annual general meeting, Sir Basil Tangye (Tangyes, Limited) was re-elected chairman of Council, and Mr. A. L. Stuchbery (Metal Box Company, Limited) and Mr. G. R. Pryor (Edward Pryor & Son, Limited) as vice-chairmen.

"YZ" Club

Yet another "Safety" club, in addition to the "Golden Eye" and the "Golden Shoe" has just enrolled its first two members. It is the "YZ" Club, the formation of which by RoSPA (the Royal Society for the Prevention of Accidents) was first announced in October, 1960. Its objective is to encourage employees to take a greater personal interest in the prevention of industrial accidents, and membership is restricted to industrial workers who, by wearing a safety helmet or hard hat whilst at work, have saved themselves from serious head injury from falling materials.

In 1959, the last year for which detailed figures are available, 14,547 industrial workers were injured as a result of being struck by falling objects, and 72 of them died. Not all of those 14,547 people received head injuries; there were, in fact, 9,029 accidents resulting in injuries to the head, and many of them could undoubtedly have been prevented by the wearing of head protection.

The growth of the Club will be watched with interest, since it will serve to indicate the rate of progress in the campaign to encourage the more extensive use of hard hats. Many firms in a wide variety of industries are already setting a good example, but industrial head injuries will only be reduced when *all* employees who are likely to be exposed to the risk of falling materials have been provided with head protection and wear it.

The first two members to receive the YZ Club lapel badge are Mr. D. C. Hicks, a process operator with British Titan Products Company, Limited, and Mr. R. W. Harrison, a tackleman for Dorman, Long (Steel), Limited. Both were wearing safety helmets when struck by falling objects.

Full details concerning membership of the Club may be obtained from the Industrial Safety Division, RoSPA, 75, Victoria Street, London, S.W.1.

John Brown Forms New Subsidiary

John Brown & Company, Limited, have formed a new subsidiary, Cravens (Machines), Limited, of Darnall, Sheffield, to take over the machine-building activities previously carried out by Cravens, Limited, at the same address. This is mainly the manufacture of plastic injection-moulding machines, together with the full range of H.P.M. presses and Castmaster die-casting machines. The board of directors is:—Mr. Eric Mensforth (chairman), Mr. J. E. Owston (managing director), Lord Aberconway, Mr. R. J. Barclay, Mr. L. Creighton, Mr. G. K. Johnson and Mr. H. Booker (secretary).

John Brown last year bought Bone Brothers, Limited, manufacturers of plastic extrusion equipment and paper machinery. A close working arrangement is now being established between Bone Brothers and Craven (Machines), Limited. Following this, Wickman, Limited, have, by mutual agreement, ceased to act as sales agents for H.P.M. injection-moulding machines. Mr. C. F. Cunningham has transferred from Wickman to the new company as the chief sales engineer, and he will also represent Bone Brothers for their plastic machinery. Wickman will continue as sales agents for H.P.M. and Castmaster die-casting machines and H.P.M. metal-working presses.

The offices of the *Associazione Italiana di Metallurgia* (Italian Metallurgical Association) are now situated at 10 Via del Politecnico, Milan.

Lloyds Participate in CTTW

During Commonwealth Technical Training Week the exhibition stands of F. H. Lloyd and Company, Limited, and Lloyds (Burton), Limited, attracted considerable attention at Wednesbury and Burton, where apprentices from the two companies gave moulding demonstrations daily. Members of the public were invited to try their hand at moulding a miniature anchor, cast in white metal, from a small electric furnace, and many delighted youngsters were able to take home an example of their handiwork as a souvenir. At Burton, one of the first anchors to be produced was cast by the Mayor, who showed considerable interest in the moulding, coremaking, fettling, etc., which went into the production of the miniature anchor. In consequence of the interest shown by so many youngsters it is hoped that the foundry industry will, in the near future, recruit many of these young men whose interest was first awakened during Commonwealth Technical Training Week.

FIGS. 1 (*above*) AND 2 (*below*).—*That there is nothing quite like having a go was amply demonstrated on the stands of F. H. Lloyd and Company, Limited, and Lloyds (Burton), Limited, at the Commonwealth Technical Training Week Exhibition, where a "try-it-yourself" offer aroused great enthusiasm in young people.*

Anodised Aluminium Conference*

The Aluminium Development Association, with the University of Nottingham Department of Metallurgy, is organizing a residential conference at the University from September 12 to 14. There will be technical sessions on the afternoon of Tuesday, September 12, and morning and afternoon sessions on Wednesday. The conference will end officially after breakfast on Thursday.

The aim of the conference is to provide an opportunity for anodisers, users of anodised aluminium, and the industry generally to discuss the latest technical developments and to give research workers in this field an opportunity to discuss the fundamental aspects of their subject.

Fifteen papers, by British and foreign authors, will be presented. They will be grouped into six sessions under separate headings, and will be printed and distributed well before the conference, so that the appropriate papers can be briefly introduced at each session and the rest of the time devoted to discussion and authors' replies. Sessions III and IV, which will appeal to different groups of people, will be held simultaneously as will also sessions V and VI.

Accommodation will be in Cripps Hall, a new University building, and the all-in charge for the conference is five guineas; for two nights only—four guineas; and for meals only—three guineas for each person. There is limited accommodation for members of the conference who wish to bring their wives. Forms of application, containing full details of fees, times, etc., can be obtained from the secretary of the Aluminium Development Association, 33, Grosvenor Street, London, W.1. Early application is desirable as there may have to be come limitation on numbers.

* In a forthcoming JOURNAL, it is proposed to print a substantial abstract from the paper by Mr. E. A. Bloch on "Aluminium Castings for Anodic Oxidation," presented at the 1960 International Foundry Congress.

BISRA's New Research Section

The British Iron and Steel Research Association has created a new section in its plant engineering and energy division to centralize the Association's research into control engineering. When the plant engineering and energy division was formed, an electrical engineering section was included to carry out research into the electrical equipment used in steelworks. During the last few years, the research of the section has tended more and more towards the electrical engineering aspects of automatic control systems, and some work on hydraulic-control systems has also been carried out in another section of the division. To bring all the work in the division on control engineering within the province of one section, the electrical engineering section has been replaced by a new control engineering section. Mr. J. P. Clyne, who recently joined BISRA from the Sperry Gyroscope Company, Limited, has been appointed head of the section.

Personal

Mr. A. E. DE BARR has taken up the post of director of research of the Machine Tool Industry Research Association.

Mr. E. W. NEWMAN has relinquished his seat on the board of Tangyes, Limited, engineers and pump and machine-tool manufacturers, Smethwick.

Sir STUART GOODWIN, the Sheffield industrialist, has made another gift of £1,000 to the Bishop of Sheffield, Dr. Leslie Hunter, to help clergy and their wives, and workers to get holidays.

Mr. V. H. CROZIER, since 1954 assistant commercial manager of Vickers-Armstrong (Engineers), Limited, Barrow-in-Furness, retired on May 31 after almost 50 years with the company.

Mr. C. S. P. MALLAM, formerly chief accountant, is appointed controller, and Mr. B. E. DAVY, formerly deputy chief accountant, is appointed chief accountant of the General Electric Company, Limited, as from July 1.

Dialoy, Limited, announce that Mr. F. T. DAVIES, A.C.I.S., A.M.I.W.M., who has been company secretary for the past five years, has been appointed financial director and secretary of the company with effect from May 17.

Mr. E. BUTTEN, chairman of Personnel Administration, Limited, has been elected chairman of the Management Consultants Association, in succession to Mr. W. COUTTS DONALD whose term of office has now come to an end.

Sir EDWARD PLAYFAIR, K.C.B., has been appointed chairman of International Computers & Tabulators, Limited, with effect from August 1 on which date he will be released from the post of Permanent Secretary to the Ministry of Defence.

The following have been appointed to the board of Hadfields, Limited, Sheffield. Sir PETER ROBERTS, BT., M.P., the Rt. Hon. LORD RIVERDALE, D.L., J.P., Sir ROBERT ADEANE, O.B.E., J.P., Mr. FREDERICK H. BROOKS, and Mr. KENNETH E. WALKER.

Mr. A. G. M. GREZO has been appointed sales manager of Workington Iron & Steel Company, a branch of the United Steel Companies, Limited. He will be responsible to the commercial manager, Mr. J. Laird, for the sales of all Workington products.

Mr. J. J. GRACIE, director and general manager of the Witton, Birmingham, works of the General Electric Company, Limited, until retirement last December, has been elected president of the Birmingham Chamber of Commerce. He is a director of The Mint, Birmingham.

Mr. E. W. F. CLEMENTS, chief mechanical and electrical engineer of Consolidated Gold Fields of South Africa, Limited, has been appointed a director of Ambuco, Limited, Old Bond Street, London, W.1, a member of the Gold Fields Mining and Industrial group.

Mr. R. G. HUXTABLE, M.B.E., who has been secretary of the South Eastern Gas Board since 1956, and was previously the Board's solicitor, is to be the new secretary of the Gas Council. On August 1, he succeeds Mr. WILFRID BAILEY, who becomes deputy chairman of the Southern Gas Board.

Grant, Lyon & Company, Limited, of Scunthorpe, Lincolnshire, announce that Mr. G. A. JONES, who was formerly the company's South Wales regional manager, has now been appointed the company's technical representative for the whole of England and Wales, with the exception of Durham and Northumberland.

Shipping manager for more than 30 years of George Cohen Sons & Company, Limited, Mr. JAMES BRENNAN, retired on March 31 after 52 years with the company. Mr. Brennan was a founder member and first hon. secretary of the 600 Group's "25 Club," founded in 1952, membership of which has now reached over 600.

Dr. FRANZ KOENIGSBERGER has been appointed the first holder of the Chair in Machine Tool Engineering at Manchester University. He is 53 and received his engineering training in the Technische Hochschule, Berlin-Charlottenburg. Since 1947 he has held various academic posts in the Manchester College of Science and Technology.

Professor MEREDITH WOOLRIDGE THRING, head of the department of fuel technology and chemical engineering at the University of Sheffield, is going to the Argentine for a fortnight in July to set up a department of fuel technology in the University of Buenos Aires. This will be the first department of fuel technology in the Argentine.

Mr. H. HUMPHREYS, managing director of Hadfields, Limited, Sheffield, was elected president of the National Trades Technical Societies at their annual conference on June 3. He succeeds Mr. J. F. STANIER. A presentation was made to the secretary, Mr. W. H. BOULTON, to mark his 43 years' service. Grants of over £5,000 were announced.

Mr. WILLIAM KEEN, melting technical adviser of Jessop-Saville, Limited, Sheffield, has been elected president of the Electric Steel Makers Guild of Great Britain. He has been with the Jessop-Saville organisation through the whole of his 47 years' industrial experience and started with electric steel melting in its earliest days in the first world war.

The Minister of Power has re-appointed the following members of the Iron and Steel Board: SIR CYRIL MUSGRAVE, K.C.B., chairman; SIR LINCOLN EVANS, C.B.E., deputy chairman, and Mr. A. G. STEWART, part-time member. The Minister has also appointed Mr. N. C. MACDIARMID as a part-time member in place of Mr. ARNOLD E. PEARCE, whose appointment expired on May 31. The appointment of Sir Cyril Musgrave, who has been full-time chairman of the Board since March 1, 1959, will be on a part-time basis from July 1. The other appointments are with effect from June 1.

Mr. G. RONALD PRYOR, chairman and managing director of Edward Pryor & Son, Limited, marking devices, Broom Street, Sheffield, was presented with a certificate of honorary membership of the Institute of Production Engineers at a dinner party at the House of Lords on June 15. The party was given by Lord Sempill, past-president of the Institution, and attended by members of the Council. Mr. Pryor was president of the Institution from 1959 until this year, and is a former president of the Sheffield section committee, and chairman, East and West Ridings regional committee.

Mr. D. R. O. THOMAS, chief education officer of the United Steel Companies, Limited, Sheffield, has been appointed chairman of the Federation of British Industries' Working Party, which has been set up to prepare evidence on behalf of industry to be put before the new committee on higher education. Lord ROBBINS is the chairman of the committee which will "review the pattern of full-time education in Britain, and in the light of national needs and resources, advise H.M. Government on what principles its longer term developments should be based." Mr. Thomas is already chairman of the FBI, and Technical and Commercial Colleges Joint Committee.

American Letter

Oil versus Coke

A number of major US steel producers believe they can raise the output of their blast-furnaces by 15 to 30 per cent. by the introduction of fuel oil or natural gas. At the same time, they expect to reduce their requirements of coal and limestone by as much as 25 per cent. With the new method of fuelling, oil is injected along with the heated air, the oil serving as part of the source of heat. Since the oil also contains hydrogen, it also contributes additional reducing gas to speed the reduction of ore into iron. If the new process should be generally adopted in the steel industry, the US petroleum industry would have an important new market for fuel oil, but the country's coal industry would be hard hit and the chemical industry would also be affected. Some $300,000,000 worth of benzene, napthalene and other chemicals used in the manufacture of paints, drugs and plastics, are produced each year by the US by-product coke-ovens. A US oil executive is quoted as saying that "if the demand for heavy fuel-oil suddenly increased, there would not be enough to go round, unless the import quota was raised." The supply problem in the States stems from the fact that quantities of heavy fuel-oil are imported at the present time under strict quotas.

Along with those from other countries, US steel research workers have been working for years on various methods of improving the efficiency of blast-furnaces, and have also studied ways of by-passing the blast-furnace completely by direct reduction. A number of schemes for direct reduction are under study, but nevertheless, the petroleum process has apparently aroused more interest and enthusiasm in the US steel industry than any other in recent years.

US Automobile Output

It is estimated that the US will have built about 1,180,000 cars in the first quarter of this year, or 800,000 fewer than a year ago, and about 270,000 below the original schedules, see Table I.

TABLE I.—*American Automobile Production 1961 and 1960.*

	First Quarter, 1961	First Quarter, 1960
Total cars (US)	1,087,761	1,888,273
Total trucks	241,288	356,666
Total cars and trucks (Canada)	96,111	116,796

The introduction of the smaller car caused a decrease of 23 per cent. in imports to the US from 614,000 in 1959 to just under 500,000 in 1960. A further decline of imports of foreign cars to an annual rate of about 400,000 is expected in 1961. Revised predictions are that total 1961 model production will run between 5,200,000 and 5,400,000 units, compared with just over 6,500,000 in 1960. Several factors will affect US output in 1961—unsettled business conditions and labour negotiations—and negotiations on new contracts are to begin about July 1.

Coke "Marbles" for Blast-furnaces

At the annual stockholders' meeting of the Consolidation Coal Company held last month, Mr. Joseph Pursglove, Jr., vice-president in charge of research and development, revealed that his company was working with three other companies on a project to produce a "carbon fuel" for blast-furnaces in specified sizes and shape, the most likely shape appeared to be a small ball, perhaps 1-in. dia. The theory behind the research was that standard-size coke "marbles" would greatly improve furnace performance and productivity and eliminate any need for gas or oil injection to supplement the coke. Another potential advantage would be that it could start with almost any kind of coal, instead of the higher-priced metallurgical-grade coal now required for making blast-furnace coke. Mr. Pursglove further stated that the coke marbles would be made of carbon particles obtained by roasting fine coal in a "fluidized bed" reactor and in such a reactor, most of the unwanted sulphur was driven out of the coal along with the volatile substances in the raw coal.

Smoke-control Exemption requested

Exemption from a Sheffield smoke order for a fireplace with a dog-grate dating back to 1550, was asked for at a public inquiry into the order held at Sheffield Town Hall. The house in which it is situate is Cannon Hall, Butts Hill, Totley, which comes into Sheffield Corporation's proposed No. 8 (Norton) Smoke Control Order. Mr. Jack Lindsay representing the owners, said the house had existed at least since 1423, when a rent of one red rose a year was charged for it. The present owners had spent a great deal of capital on restoration and modernization. He said, "If this fireplace is altered in any material form, it will destroy the most interesting feature of this house." He said the fireplace was in the lounge and burned mainly wood, though a small amount of coal was used. It was not suitable for burning smokeless fuels and could not be adapted for the purpose at reasonable cost. He claimed that the fireplace should be exempted because of its historical interest, and that Cannon Hall itself should be included in the Corporation's list of "isolated property" which qualified for exemption.

Mr. J. W. Batey, Sheffield Corporation Superintendent smoke inspector, agreed that he was not satisfied with the dog-grate when burning smokeless fuel, because of the limited test he had been able to carry out. When he was asked if he was not interested in preserving such things as the dog-grate and fireplace, he said he did not like the ash which dropped from it nor the smoke which came out of the chimney.

Mr. T. Holt, principal assistant solicitor for Sheffield Corporation, submitted that there were forms of space heating which could be used to avoid destroying the fireplace. After the inquiry was closed, the Inspector of the Ministry of Housing and Local Government, Mr. C. T. Blackall, visited the site. The Minister's decision will be announced later.

Iscor Expansion Programme

Dr. F. Meyer, chairman of Iscor, the South African Iron and Steel Industrial Corporation, stated at the seventh Commonwealth Mining and Metallurgical Congress, held in Johannesburg recently that on completion of the Corporation's current expansion programme later this year, production would be about 2,350,000 tons of ingot steel per annum; Iscor now produces about 1,800,000 tons a year. The present expansion and modernisation of Iscor, forming part of a 12-year programme, is expected to cost about £56,000,000. When the overall programme was completed, said Dr. Meyer, the Corporation would be producing an additional 2,000,000 tons of ingot steel, and providing the present costs of industrial plant were maintained, the programme was expected to cost about £270,000,000 to £280,000,000; in addition about £17,000,000 would be spent on housing for employees. Capacity of Iscor will then be near 4,500,000 ingot tons a year.

British Blast Furnaces in the March Quarter, 1961

Derbyshire, Leicestershire, Notts, Northants, and Essex.

Name of firm.	In blast at end of the first quarter, 1961.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	1	—	1	1	3
Renishaw Iron	—	1	1	—	2	2	2
Sheepbridge	—	2	—	—	2	1·5	2
Stanton Ironworks: Stanton-by-Dale	—	2	3	—	5	5	5
Staveley Iron & Chemical	—	1	3	—	4	4	4
Stewarts and Lloyds: Corby	—	4	—	—	4	4	4
Wellingboro' Iron	—	1	—	—	1	1·5	3
TOTAL	—	11	9	—	20	20	24

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

Brymbo Steel Works	—	1	—	—	1	1	1
Darwen & Mostyn Iron	—	—	—	1	1	1	2
Lancashire Steel Manufacturing	—	2	—	1	3	3	4
Summers, John	—	2	—	—	2	2	2
TOTAL	—	5	—	2	7	7	9

North-West Coast.

Barrow Ironworks	1	—	1	—	2	2	2
Charcoal Iron	—	—	1	—	1	1	1
Millom Hematite Ore & Iron	2	—	—	—	2	2	3
United Steel: Workington	2	—	—	1	3	3	3
TOTAL	5	—	2	1	8	8	9

Lincolnshire.

Appleby-Frodingham Steel	—	4	—	—	4	4	4
Lysaght's Scunthorpe Works	—	3	—	—	3	3	4
Thomas, R., & Baldwins: Redbourn	—	3	—	—	3	3	3
TOTAL	—	10	—	—	10	10	11

North-East Coast.

Consett Iron	—	3	—	—	3	3	3
Dorman Long (Steel): Acklam	—	2	—	—	2	2	4
Redcar	—	—	—	—	—	—	2
Bessemer	—	2	—	—	2	2·7	3
Clay Lane	—	2	—	—	2	2	2
Gjers, Mills	2	—	—	—	2	2	3
Skinningrove Iron	—	2	—	—	2	2	3
South Durham Steel & Iron:							
West Hartlepool	—	2	—	—	2	2	3
Cargo Fleet	—	2	—	—	2	2	3
TOTAL	2	15	—	—	17	17·7	26

Scotland.

Bairds & Scottish Steel: Gartsherrie	1	1	—	—	2	2	4
Carron	—	—	1	—	1	1	2
Colvilles: Clyde Iron Works	—	3	—	—	3	3	3
Ravenscraig	—	1	—	—	1	1	1
TOTAL	1	5	1	—	7	7	10

South Wales and Monmouthshire.

Guest Keen Iron & Steel: Cardiff	1	2	—	—	3	3	4
Thomas, R., & Baldwins: Ebbw Vale	—	3	—	—	3	3	3
Steel Company of Wales: Margam	—	4	—	—	4	4	5
TOTAL	1	9	—	—	10	10	12

(These tables are published through the courtesy of the British Iron and Steel Federation.)

Ossett Firm's Extensions

To mark the occasion of her 80th birthday on July 2, Mrs. F. M. Oddie, chairman of directors of Spencer & Halstead, Limited, Ossett, is to present the firm with a tennis court and pavilion for their Sports and Social Club. Mrs. Oddie will also cut the first sod on the site of the £30,000 works extensions which will include a new fabricating shop, the doubling of the size of the drawing office and extensions to the stores and spare parts despatch building.

Spencer & Halstead, which was founded in 1912, was purchased in 1914 by the late Mr. W. Muir Oddie, when it employed some six sheet metalworkers and was engaged in the manufacture of dust-collecting plant and wool-conveyor equipment for the textile industry. The firm is still wholly owned by the Oddie family and has, in the intervening years, taken up the design and manufacture of many other engineering specialities including shotblast plant and air-conditioning systems.

Some 300 people are now employed and the firm has branch offices in Epsom, Surrey, covering the south of England, and in Holland where sales and service facilities as well as sub-contracting for delivery in the European Common Market countries, are undertaken. Agencies have been established in the USA, Canada, Australia, New Zealand, South Africa, Switzerland, Italy, Greece, Egypt and the Scandinavian countries, which ensure that some 30 per cent. of the firm's products are exported.

Glenfield's New Laboratory

The possibility of exporting goods to the Soviet Union and satellite countries is being pursued by Glenfield & Kennedy, Limited, valve specialists and hydraulic engineers, Kilmarnock. They have already received a substantial order from Czechoslovakia for micro-straining equipment. Sir James Hutchison, Bt., chairman of Glenfield & Kennedy (Holdings), Limited, said on June 8, on the occasion of the official commissioning of a new £100,000 hydraulics laboratory which will be available for the use of the Glenfield group of companies.

The possibility of equipment made in Kilmarnock being sold to the Soviet Union follows a visit by Sir James to the Moscow Trade Fair. He also revealed that last year the firm earned $1,500,000 from the sale of micro-strainers to the US and Canada. The group of companies exported over £2,000,000 worth of goods last year, about 25 per cent. of the turnover. Glenfield & Kennedy in Kilmarnock exported directly or indirectly about 30 per cent. of their £3,000,000 turnover to 82 countries. There is little doubt that the facilities of the new laboratory will help to increase the export figures.

The new laboratory replaces a test house where research and development were carried out on a limited scale. Testing work for contracts will be carried out there, such as on a working model of the Warragamba Dam in Australia for which the group have recently completed a £500,000 contract.

Because of the difficulty of programming research and development work the laboratory has been designed to give maximum flexibility and adaptability of layout. The water storage tank has a capacity of 72,000 gallons (320 tons) and water can be circulated at 20 cu. ft. per sec., a rate which few other privately owned hydraulic laboratories can equal. There is also an aerodynamics laboratory where tests can be carried out using air instead of water so that prototype models can be made of plywood or other inexpensive materials. The annual cost of the maintenance and operation of the laboratory will be about £15,000.

THE MAGAZINE *Research* is again organizing a Waverley Gold Medal Essay Competition carrying substantial prizes. Details of the 1961 competition are available from the Editor, 88, Kingsway, London, W.C.2. Closing date for entries is July 31.

British Blast Furnaces in the March Quarter, 1961—*continued*

Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of first quarter, 1961.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Goldendale Iron	—	—	1	—	1	1	2
Shelton Iron & Steel	—	3	—	—	3	3	3
Stewarts and Lloyds: Bilston	—	1	—	—	1	1	2
TOTAL	—	4	1	—	5	5	7
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	9	61	13	3	86	86.7	110

Weekly Average Number of Furnaces in Blast during the March Quarter, 1961, and the Previous Four Quarters

District.	1960.				1961.
	March.	June.	Sept.	Dec.	March.
Derby, Leics., Notts., Northants, and Essex	18·8	20.6	20.3	20.1	20
Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Cheshire	6.5	6.4	6.9	7	7
Lincolnshire	10	8.4	9.3	10	10
North-East Coast	16·4	17	17.6	17.9	17.7
Scotland	5·9	6.9	7	7	7
Staffs., Shrops., Worcs., and Warwicks.	4·6	4.5	5	5	5
South Wales and Monmouth	11	11	10	10.2	10
Sheffield	2	2	2	2	2
North-West Coast	8	8	7	7.8	8
TOTAL	83·2	84.8	85.1	87	86.7

The following companies have furnaces in course of construction or rebuilding:—Dorman Long (Steel) South Durham Steel & Iron Company, West Hartlepool Works, Colvilles, Ravenscraig Works, Ford Motor Company, Barrow Ironworks, and R. Thomas & Baldwins, Spencer Works (two furnaces).

"Operation Spear"

Over the next five years, the Steel, Peech & Tozer branch of the United Steel Companies, Limited, will be replacing its 21 open-hearth furnaces by six 110-ton capacity electric-arc furnaces. Known as "Operation Spear" (*S*teel, *P*eech *E*lectric *A*rc *R*econstruction), this development will give the works what is claimed to be the largest electric steelmaking plant in the world, capable of producing an annual ingot output of 1,350,000 tons of steel, compared with the present level of 1,000,000 ingot tons. As a result of this major technical change, the labour force will be reduced by over 1,000 men. There will be, therefore, some hundreds of workpeople whose earnings will be reduced.

Compensation will take the form of an *ex-gratia* payment for loss of earnings brought about through these major technical changes in the steelmaking departments, taking into account three factors:—loss of earnings, years of service, and age. The maximum payment to any one man will be £300. It is emphasized that this scheme is designed as compensation for loss of earnings under quite exceptional circumstances.

MR. GEORGE TALBOT has been appointed deputy managing director of Stein & Atkinson, Limited, engineers, Richmond, Surrey.

News in Brief

CONSOLIDATED ASSEMBLY INC., P.O. BOX 2154, Manila, is now the sole concessionaire for Leyland and Albion trucks, buses and spare parts throughout the Philippine Republic.

THE LONDON OFFICE of Crofts (Engineers), Limited, moves on June 26 from 34, Norfolk Street, Strand, London, W.C.2, to new premises at 36/42, Tanner Street, Bermondsey, London, S.E.1 (telephone: HOP 7751/4).

MR. GRAHAM PARRAMORE stressed the value of social activities among employees when he presented angling awards to personnel of F. Parramore & Sons (1924), Limited, ironfounders, at Chapeltown, Sheffield, on March 29.

UNITED DOMINIONS TRUST, LIMITED, announce the following changes of address:—Sheffield branch office to Pearl Assurance House, 41/55, King Street, Sheffield 3. Leeds regional offices to London and Lancashire House, South Parade, Leeds, 1.

THE LARGEST TRACTION ENGINES in the third Lincolnshire Traction Engine Rally held at North Hykeham on June 3 were two belonging to Mr. H. Challand, of Collingham. They each weighed over 16 tons and were built in 1917 for service in land cultivation.

A NEW SOUTH-WESTERN DEPOT, in Exeter, has been opened by Bowmaker Plant, Limited. The depot, designed to deal with all types of Caterpillar earth-moving equipment, the sale of new and re-conditioned plant, servicing and spares, replaces Bowmaker's Fenny Bridge branches.

AN INTERNATIONAL CONFERENCE ON HEAT TRANSFER, organized by the University of Colorado, is to be held at Boulder, Colorado, USA, from August 25 to September 1. It is sponsored by the American Society of Mechanical Engineers, 29 West 39th Street, New York, N.Y., USA.

THE MASTER CUTLER, Mr. C. H. T. Williams, is to be chairman of a conference to be held in Sheffield to discuss the range of difficulties concerning apprenticeships. It will be attended by representatives of both sides of industry and commerce and the Education Committee.

W. H. ALLEN SONS & COMPANY, LIMITED, Queens Engineering Works, Bedford, announce the receipt of two contracts from the British United Shoe Machinery Company, Limited, and Glaxo Laboratories, Limited, for steam-turbine power-plant, the combined value of the contracts being £42,000.

THE NATIONAL TRADES TECHNICAL SOCIETIES held their twelfth annual gala and sports day as guests of Newton Chambers & Company, Limited, at their Mortomley Sports ground on June 3. Prizes were presented by Mrs. P. J. C. Bovill, wife of the managing director of Newton Chambers.

THE NORTH WESTERN REGION of the Combustion Engineering Association is holding a meeting on Tuesday, June 27, at the Engineers Club, Albert Square, Manchester, commencing 2.30 p.m., at which a paper on "Shortcomings in Present-day Equipment" will be presented by Prof. M. W. Thring.

L. LIGHT & COMPANY, LIMITED, of Colnbrook, Bucks, have commenced distribution of their 1961-62 catalogue of over 6,000 organic chemicals, biochemicals, pure-elements and rare-earth oxides. It also includes details of the "Dreiding" molecular models and of a metabolic chart recently published by the company.

FAIRFIELD SHIPBUILDING & ENGINEERING COMPANY, LIMITED, Glacgow, have started deliveries of one of the biggest shipbuilding export orders to come to Scotland in recent years. The order comprises nine 210-ft. ferry boats for the Turkish State Seaways & Harbours Administration, with a total value of about £3,500,000.

CITY CONTRACTORS & PLANT HIRE COMPANY, LIMITED, of Belfast, agents in Northern Ireland for Smith cranes and excavators, are building new offices, workshops, spares departments and showrooms at Suffolk, Dunmorry, Belfast, to accommodate the expansion in their business since taking up the Smith agency 12 months ago.

HARBOROUGH CONSTRUCTION COMPANY, LIMITED, Market Harborough, manufacturers of foundry supplies, are developing land, recently acquired, adjoining the main Logan Street factory. Extension to both the foundry supplies and engineering divisions of the company with up-to-date handling facilities for raw materials will be made.

JAMES LISTER & SONS, LIMITED, engineers' merchants, High Street, West Bromwich, have moved to a new showroom with warehouse and office block in Spon Lane, West Bromwich, built at a cost of £50,000. The opening ceremony on June 17, was performed by Colonel Sir Frederick Neill, chairman of James Neill & Company (Sheffield), Limited.

WITH REFERENCE to the report on the Austria Vereinigte Emaillierwerke printed on page 691 of our issue of June 1, the hot-blast cupola plant was installed by V.E.W., the German associates of Fuel & Metallurgical Processes, Limited. This error, which we regret, was no doubt, as is pointed out at the end of the article, due to language difficulties.

THOS. W. WARD, LIMITED, Sheffield, are showing more than £50,000 worth of constructors' plant and cranes at the first international construction equipment exhibition which opened at the Crystal Palace, London, on June 15 (closes June 24). It was Ward's who dismantled the old Crystal Palace buildings in 1938, following their destruction by fire in 1936.

FOLLOWING A RECENT ORDER for four complete sets of condensing and feed-heating plant of entirely new design, for Tilbury "B" power-station, the Richardsons Westgarth Group have received a further order, value approximately £300,000, from the Central Electricity Generating Board for the condensing plant for use with a 300 mw. turbo-generator at West Thurrock power-station.

ALLIED IRONFOUNDERS, LIMITED, announce formation of the Aga heating division to develop sales of appliances connected with central heating. Captain A. M. McKillop, D.S.C., R.N. (RETD), formerly sales manager for Watts Metal Industries, Limited, is sales manager of the division under the direction of Mr. Charles Insch, sales director of the domestic appliance division.

TWICE THE USUAL NUMBER OF APPRENTICES received "passing out" certificates at the Smethwick works of Birmid Industries, Limited, at their annual prizegiving. This means 42 more names for the firm's honours board, which has already had 300 inscribed in the past 12 years. The presentations were made by Mr. E. Player, C.B.E., deputy chairman and managing director of the firm.

BORAX (HOLDINGS), LIMITED, announce that its wholly-owned subsidiary company, Hardman & Holden, Limited, has acquired the whole of the issued share capital of J. M. Beckett & Son, Limited, pigment manufacturers, Biddulph, Staffordshire. J. M. Beckett & Son, Limited, is a private limited company,

and it is intended that it should continue to trade as a separate entity.

AVELING-BARFORD, LIMITED, Grantham, have secured orders worth £500,000 for overseas delivery of road rollers, motor graders and dumpers against intense competition from American, German and Japanese manufacturers. A total of 106 machines of all three types are to be supplied to the Malayan Public Works Department, and 17 to the largest civil engineering contractor in the Argentine.

S. A. WARD & COMPANY, LIMITED, machine-tool makers, Cricket Inn Road, Sheffield, are celebrating their 70th anniversary this year. As part of the celebrations, a lunchtime cocktail party was held in a marquee set up beside the works on June 9. Guests included Mr. Norman Yardley, former Yorkshire and England cricketer, and Mr. Buxton, managing director of Brass Founders (Sheffield), Limited.

WOODALL - DUCKHAM CONSTRUCTION COMPANY, LIMITED, specialists in coking and gas plants for the gas and steel industries, London, had £21,500,000 of uncompleted orders in hand at the beginning of this year after completing £13,250,000 last year. Orders slightly exceeded deliveries, amounting to £13¼ million. Mr. T. C. Finlayson, the chairman, has stated that competition is keen and profit margins low.

STANTON IRONWORKS COMPANY, LIMITED, near Nottingham, has secured a contract for the supply of 300 mm. to 650 mm. spun-iron pipes, valued at approximately £200,000 to be used for extensions to the Alexandria sewage system. The order was obtained in the face of very keen international competition and is the first major contract for this material to be negotiated with Egypt since the Suez crisis.

THE *Chambre Syndicale des Productions d'Acier Fins et Speciaux*, 12 rue de Madrid, Paris 8, announces the production of a documentary film "Aciers Spéciaux—1960" (Special Steels, 1960). A Russian version is to be shown at the French Exhibition in Moscow and one in English is to follow. Generally a high opinion is held of French documentary films and it is reasonably certain that this film will be of a high order.

THE LEYLAND MOTORS GROUP announce the formation of a new company in Portugal which will assemble and eventually manufacture trucks, buses and diesel engines. Known as Leyland Portuguesa Ltda., the company has been formed in association with Francisco Garcia et Cia Ltda., Leyland's former Portuguese distributors. A plant is now being built at Setubal, 20 miles south of Lisbon, which is expected to be in operation by October.

AT THE GREAT YARMOUTH CONFERENCE last month foundry workers instructed their Executive Council to press for all safety equipment, including safety boots and protective clothing, to be issued free to workers. Mr. H. Davidson, of Newcastle, while lending his support to the resolution said he thought the biggest culprits were the members themselves. Employers should make employees use the equipment, as well as being called on to supply it.

A PAPER, "British Electrical Manufacture in the National Economy," which Mr. Stanley F. Steward, director of the British Electrical Allied Manufacturers Association, presented at the British Electrical Power Convention, included statistics which showed that during the decade 1950-1959, makers of electrical equipment in the UK spent £378,200,000 on capital goods (plant, vehicles and new buildings). This represented a growth of 220 per cent. compared with an average of all industries of 85 per cent.

The American Translators' Association has been established in New York "to improve the quality of translations, to formulate and maintain high professional standards and to support professional training for translators." Its first president is Dr. Alexander Gode, chief of the Interlingua Division of Science Service, New York. Membership is open to all persons actively engaged in translating and enquiries should be addressed to P.O. Box 489, Madison Square Station, New York 10, USA.

ENGLISH STEEL CORPORATION, LIMITED, have accepted the tender of John Mowlem & Company, Limited, for the major civil engineering work for their £26,000,000 development at Tinsley Park, Sheffield. The development, which will include a melting shop with two 100-ton electric furnaces, a 42-in. blooming mill, a billet mill with two 32-in. stands and a bar mill, will increase English Steel Corporation's total capacity for production of alloy- and special-carbon steels to about 500,000 billet tons per annum.

ROLLS-ROYCE, LIMITED, are taking over the factory at Cadzow, Hamilton, near Glasgow, formerly used by Standard Maclean, Limited, metal-window manufacturers. It extends to 161,000 sq. ft., of which 111,000 sq. ft. is workshop space. About 250 workers for the Cadzow factory will be recruited from the company's existing Lanarkshire factories at East Kilbride, Blantyre and Larkhall, and another 250 will be recruited locally. Rolls-Royce engineering work in Scotland centres on jet-engine production.

THE FORD MOTOR COMPANY'S Doncaster factory has stopped producing the Thames 5 and 7 cwt. vans, but there is no cut-back of production at the works. Instead the production of new-style Popular cars has been increased—to about 280 a day. A bigger proportion of work on the cars is undertaken exclusively at Doncaster and the overall production rate is greater than the previous combined total of cars and vans. The labour force has also increased since February when some short time was operating, and now stands at about 2,000 production workers.

URGING MANUFACTURERS and metal merchants to take every precaution against metal theft, Superintendent G. H. Baumber, deputy head of the CID in Birmingham, was the guest speaker at the Non-Ferrous Club's June monthly luncheon. Stress was laid on the importance of having individual marks on metal, especially the shafts of anodes, avoiding loaded lorries being unattended, of suitable burglar alarms and other safety measures. Following the lunch, a collection was taken on behalf of the Police Aided Association and the sum of £16 6s. was realized. Members were reminded of the dinner to be held on September 28 at the Greswolde Hotel, Knowle.

Obituary

Mr. K. G. THOMSON, a director of Robert Normansell, Limited, hearth-furniture and brassware manufacturers, Exeter Street, Birmingham, has died at the age of 53. He joined the family business in 1926 and became a director on the death of his father in 1936.

Chief foundry estimator at the English Steel Corporation, Limited, Sheffield, since 1934, Mr. SIDNEY TAYLOR has died aged 64. He was one of a team of 16 representing the British steelfoundry industry who studied steel methods, factory administration, organization, layout and operating conditions in the United States in 1949.

Pig-iron and Steel Production

Statistical Summary of March, 1961 Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in March. Table 3, weekly average production of finished steel in February. Table 4 gives the production of pig-iron and ferro-alloys in March, and furnaces in blast. (All figures are weekly averages in thousands of tons).

TABLE 1.—*Iron and Steel Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.[1]	Basic materials.[2]						Imports.[3]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[4]
1959	340	496	477	286	244	210	242	208	7	388	291	2,244
1960	339	505	482	329	319	264	303	243	24	467	361	2,702
1960—Dec. ..	339	537	472	325	336	272	306	232	18	451	340	2,702
1961—Jan. ..	339	538	472	351	327	272	308	248	14	478	364	2,739
Feb. ..	339	538	476	354	325	265	302	254	11	485	365	2,783
Mar.[5]	339	538	479	351	322	264	313	248	11	471	356	2,744

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in March.*

District.	Open-hearth.		Bessemer and L.D.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Steel for castings.	
Derbys, Leics, Notts, Northants, and Essex ..	—	3.3	14.0 (basic)	2.5	0.1	18.5	1.4	19.9
Lancs. (excl. N.-W. Coast), Denbighs, Flints, and Ches	1.3	34.8	—	5.8	0.4	40.9	1.4	40.9
Yorks (excl. N.-E. Coast and Sheffield) ..								1.4
Lincolnshire	—	52.1	—	—	0.1	52.1	0.1	52.2
North-East Coast	1.1	91.8	—	1.8	0.4	92.9	2.2	95.1
Scotland	0.9	46.9	—	4.1	—	49.6	2.3	51.9
Staffs, Shrops, Worcs, and Warwicks	—	27.3	—	4.4	0.8	30.4	2.1	32.5
South Wales and Monmouthshire	1.6	85.7	19.9 (basic)	0.9	0.2	107.7	0.6	108.3
Sheffield (incl. small tonnage in Manchester) ..	7.7	40.6	—	14.6	0.4	61.1	2.2	63.3
North-West Coast	0.1	—	4.6 (acid)	0.8	—	5.3	0.2	5.5
Total	12.7	382.4	38.5	34.9	2.4	458.5	12.5	471.0
February, 1961	13.3	396.9	37.8	34.8	2.5	472.9	12.4	485.3
March, 1960[6]	13.8	394.6	39.3	35.1	2.3	473.3	11.8	485.1

TABLE 3.—*Deliveries of New Non-alloy and Alloy Finished Steel.*

Product.	1959.	1960.	1960.	1961.	
			Feb.	Jan.	Feb.
Non-alloy Steel:					
Ingots, blooms, billets, and slabs[6]	5.1	5.6	6.5	5.7	6.7
Heavy rails ..	6.8	8.7	8.8	8.9	9.6
Sleepers	0.6	0.8	0.3	0.2	1.3
Fish and soleplates	0.4	0.6	0.6	0.6	0.8
Plates, 3 mm. thick and over ..	43.1	52.9	53.7	62.8	64.5
Other heavy prods.	41.2	53.1	56.7	58.9	57.7
Ferro-concrete bars	9.6	12.0	13.4	13.8	12.8
Wire rods	23.5	28.6	28.9	29.8	28.3
Arches, etc. ..	7.8	7.9	8.5	7.8	8.1
Other light sections	33.0	41.3	44.6	44.5	46.2
Bright steel bars ..	7.6	9.7	10.4	10.0	9.3
Hot-rolled strip ..	27.4	33.1	36.1	30.3	29.4
Cold-rolled strip ..	8.0	10.0	10.6	9.7	9.6
Sheets, incl. coated:	47.0	51.5	55.5	53.7	49.1
Tinplate:	20.9	22.4	26.1	21.8	21.4
Blackplate ..	0.7	0.9	0.9	0.8	0.8
Tubes up to 16 in.	20.6	23.8	25.1	20.7	21.8
Tube fittings, etc. ..	0.4	0.4	0.4	0.4	0.4
Tyres, wheels, axles	2.4	2.4	2.2	2.0	2.6
Forgings (excl. drop)	2.1	2.2	2.3	2.4	2.5
Steel castings ..	3.6	4.3	4.5	4.5	4.7
Tool steel	0.2	0.2	0.2	0.2	0.2
Total	312.0	374.4	396.3	389.5	387.8
Alloy steel	18.2	22.5	23.8	23.1	23.4
Total UK deliveries[7]	330.2	396.9	420.1	412.6	411.2
Add: Imported finished steel ..	7.1	19.1	15.6	6.9	7.1
	337.3	416.0	435.7	419.5	418.3
Deduct: Intra-industry conversion[8] ..	47.6	56.4	60.9	56.8	54.2
Total new material ..	289.7	359.6	374.8	362.7	364.1

TABLE 4.—*Production of Pig-iron and Ferro-alloys.*

District.	Furnaces in blast.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.
Derbys, Leics, Notts, Northants, and Essex	20	—	28.0	20.7	—	48.7
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Ches ..	7	—	23.2	—	1.2	24.4
Yorkshire (excl. N.-E. Coast and Sheffield)	—	—	—	—	—	—
Lincolnshire	10	—	48.7	—	—	48.7
North-East Coast ..	17	2.6	66.5	—	0.2	69.3
Scotland	7	1.1	25.7	0.7	—	27.5
Staffs, Shrops, Worcs, and Warwicks ..	5	—	10.9	1.0	—	11.9
South Wales and Monmouthshire	10	3.7	56.1	—	—	59.8
Sheffield	2	—	3.5	—	—	3.5
North-West Coast ..	8	16.5	—	1.2	2.0	19.7
Total	86	23.9	262.6	23.6	3.4	313.5
February, 1961 ..	87	24.4	250.5	23.6	3.9	302.4
March, 1960[5]	87	26.0	257.2	25.0	4.1	312.3

[1] The index for coal is now based on prices ruling on the last day of each month.

[2] Used in non-food manufacturing industries.

[3] Weekly average of calendar month.

[4] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.

[5] Five weeks, all tables.

[6] Other than for conversion into any other form of finished steel listed.

[7] Includes finished steel produced in the UK from imported ingots and semi-finished steel.

[8] Material for conversion into other products also listed in this table.

Company News

TANGYES, LIMITED, manufacturers of diesel engines, pumps, hydraulic machinery, etc., of Birmingham—Group net profit for 1960 is £37,760 (£28,019 loss), after tax of £272 (£743).

HALE & HALE (TIPTON), LIMITED, malleable iron-founders, of Dudley Port, Tipton—The directors have declared an interim dividend on the ordinary shares of 5 per cent. for the current year, payable on July 31.

SPECIALLOID, LIMITED, manufacturers of pistons, piston rings, and gudgeon pins, of Leeds (Yorks)—Final dividend of 15 per cent., as forecast, makes 25 (20) per cent. for the year to April, 1961. Net profit increased to £53,334 (£45,464), after tax of £60,911 (£44,412).

MIRRLEES WATSON & COMPANY, LIMITED, engineers, iron and non-ferrous founders, etc., of Glasgow—Group profits fell from £142,461 to £69,653 in the year to March 31, 1961, and the dividend is halved to 7½ per cent. After tax of £44,069 (£67,127), the net balance is £25,584 (£75,334).

HEENAN, LIMITED GROUP—Approval is being sought from shareholders to allow the board to make application to London and Birmingham Stock Exchange for permission for quotation for ordinary shares totalling £46,875 in nominal value, which may have been, or may hereafter be, issued pursuant to options granted to certain executive directors of the company and of its subsidiaries. An extra-ordinary meeting will be held in Worcester on June 26.

S. RUSSELL & SONS, LIMITED, mechanical and structural engineers, of Leicester—Mr. George Russell, the chairman, says that the board has decided on a rebuilding plan to cost about £125,000, of which the major part will be met by the issue of 374,000 ordinary 5s. shares. These shares are now offered to ordinary holders on June 1, in the proportion of one-for-four. The directors forecast a dividend of 15 per cent. for the year ending March 31, 1962, on capital as increased by the present issue.

GLACIER METAL COMPANY, LIMITED, manufacturers of plain bearings, bearing metals, die castings, etc., of Wembley (Middx)—Projects involving an investment of £450,000 are listed by the chairman, Mr. W. B. D. Brown, in his annual statement with the accounts. This did not cover all future investments nor did it relate to the current year. Expanding trade would also make demands for increased working capital, so that it might be necessary in the not too far distant future to raise additional capital.

FAIRBAIRN LAWSON COMBE BARBOUR, LIMITED, textile machinery manufacturers, etc., of Leeds (Yorks)—Trading accounts for the year to March 31, 1961, should break even or show a small profit. This compares with a loss, before tax and other non-trading profits, in the previous year of £28,729 and a loss of £190,231 in 1958-59, when the Dundee factory closed down. Important steps have been negotiated regarding diversification, but projects will not "produce any serious revenue this financial year."

EFCO, LIMITED (formerly Electric Furnace Company, Limited), London, S.W.1—Dividend for the year to March 31, 1961, is being effectively raised to 11¼ (10) per cent., with a second interim, in lieu of a final, of 7½ per cent. on capital doubled by a scrip issue. The more liberal distribution is justified, the directors state, in view of the approaching completion of the works construction programme which the company has been carrying out during the last three years and financing largely out of retained profits.

WHESSOE, LIMITED, manufacturers of capital plant for the oil, atomic power, gas and chemical industries, of Darlington—Trading profits contracted from £990,130 to £626,254 in the year to March 31, 1961, but the total dividend is maintained at 27½ per cent. with a final of 22½ per cent., from a net balance of £331,254 (£440,130), after tax of £295,000 (£550,000). Orders on hand are at a high level, it is stated, and gross work in progress has increased, but the effect of lower price levels will continue to be felt.

ELLIOTT-AUTOMATION, LIMITED—Group turnover increased by 25 per cent. to £20,000,000 in 1960, and the chairman, Mr. R. E. F. de Trafford, reports an encouraging upward trend in sales and profit during the current year. "We are confident we can look forward to a further improvement in our results for 1961," he states. Despite the large growth in turnover during the past year, the group's order-book has risen steadily since the last report. "We can, therefore, look forward to further expansion in the volume of our business," the chairman adds.

FIRTH CLEVELAND, LIMITED—Mr. C. W. Hayward, chairman and managing director, states that the steel companies experienced a high level of activity at the start of 1960 and had a successful year, although towards the end of the period there was some slackening in demand. A "substantial" tonnage of speciality steel was exported to the US during the year and similar success was achieved elsewhere. All departments of the subsidiary Richard Hill, Limited, had record production and sales, and new export markets were entered successfully. Group exports were higher in 1960 and amounted to 18 per cent. of turnover, excluding the retail division.

BUTTERLEY COMPANY, LIMITED, bridge builders, general engineers, ironfounders, etc., of Derby—Mr. M. F. M. Wright, the chairman, in his annual statement, explains that the sale of Air Products (Great Britain), Limited, followed the realization that the construction of plants, etc., necessary for that company's development required very much larger sums than originally contemplated. The sale will enable certain developments in Butterley Company's existing line of business to be carried out more easily and the return is likely to be in excess of anything that might be anticipated from Air Products for many years to come.

SCOW's Reduced Earnings for Half-year

Lower earnings in the first six months of the year ending September 30, 1961, are reported by the Steel Company of Wales, Limited, which is maintaining its interim dividend at 1s. per £1 share on the £40,000,000 ordinary capital. Sales and other income of £68,650,000 in the half-year to April 1, 1961, compared with £70,901,000 in the first six months of the previous financial year. The trading surplus, before depreciation, is £2,310,000 lower at £12,300,000. After all charges and provisions, including £1,500,000 (£1,350,000) to fixed assets replacement reserves, the half-year's net balance of £2,133,000 compares with £3,010,000 in the corresponding period of last year.

The directors state that the reduced earnings are due to the recession in demand for sheet and tinplate during the half-year, and to the substantial increases in fuel and wages costs without compensating increases in selling prices.

For 1959-60, a final dividend of 1s. 6d. was paid, making 2s. 6d. per share for the year.

Raw Material Markets

Iron and Steel

Some 86 furnaces are now in blast, and from these adequate supplies of pig-iron are being obtained to satisfy the needs of all consumers; 61 are engaged in the production of basic pig-iron which the steelworks are absorbing in substantial quantities, but larger tonnages could be supplied should demands increase. The iron foundries are also well catered for, and no difficulty is experienced by producers in meeting present demands for the different grades required. Overall productive capacity of pig-iron is not at present being obtained, and in all grades of pig-iron increased quantities could be made available within reasonable limits. Many producers are unable to dispose fully of their makes, and they also hold fairly good stocks.

The engineering and speciality foundries continue to use large tonnages of low phosphorus iron, hematite and some refined irons. Business at these establishments for high-duty castings is maintained at recent levels, and good support continues to be given by many trades. The motor car industry is specifying freely as well as the machine-tool industry, the heavy engineering trades, and power and electrical plant manufacturers. Substantial outputs continue to be obtained by these foundries and although most of them are not now so heavily engaged, they have sufficient work on hand to provide for a full normal working week.

High phosphorus irons are in good supply and are not being taken up to the full extent of production by the light, jobbing, textile, and some of the engineering foundries. More work is needed by many of the light foundries, and most of the jobbing and textile foundries have capacity to spare.

Scrap merchants generally are keeping the foundries fairly well supplied, but demands for heavy cast-iron and machinery scrap are in excess of the arisings of these grades. Foundry coke, ganister, limestone, and firebricks are delivered to requirements.

There is little change in the pattern of business at the re-rollers and most establishments could undertake much more work than that at present available. Demands for small bars and light sections are moderate and well below previous levels. Strip and bright drawn bar is also in reduced demand. Apart from reinforcing rods which continue in heavy request, most products of the re-rollers can be obtained at relatively short notice. In fact, difficulty at times is experienced in obtaining a full rolling of some sizes of sections and bars.

There are fairly adequate supplies available of all grades of steel semis, with mild steel material being the most plentiful. For the latter many of the re-rollers appear to hold good stocks as demand on home steelworks for supplies shows little improvement, and is much below the tonnage available. Arisings at the steelworks of suitable re-rolling defectives and crops are readily accepted by the re-rollers.

Non-ferrous Metals

Copper markets on both sides of the Atlantic have lost their momentum. The bullish influences formerly pressing on the market have evaporated and the price has slumped to below £235 a ton or £15 a ton lower than it was at its peak of £250 a ton only a month ago.

What has happened is that most of the labour troubles have been settled, if only temporarily. Accordingly, consumers have held off entering the market and the quotation has fallen steadily. On the other hand, the US Copper Institute's figures for May were encouraging, with deliveries of copper to fabricators up sharply and stocks of refined copper in the US down by 18,000 tons. But overshadowing these figures was production which was up by as much as 25,000 tons.

In the same way as the London market has registered its views by dropping the price, the New York market has been having a thin time and metal is reported to be changing hands at below 31 cents a pound—the officially quoted price for both producer and custom smelter copper. Moreover, the custom smelter intake price for copper scrap has been lowered to 26¼ cents a pound so that the previously expected rise in the price of copper is not now imminent.

Tin continues to be the most active of the non-ferrous metals and turnover in the London market has again been very large. Interest these days centres around guessing how much metal the buffer stock manager has released from his stocks to satisfy demand and keep the price at its ceiling of £880 a ton for cash metal. The outlook is still unclouded and with demand remaining steady from all sources and production figures from Malaya still showing a decline, the statistical position is very tight. In the US demand is good and steady and the price is higher than $1.12 a pound.

Lead is a better market in New York than in London but that does not say a great deal as there are ample supplies to satisfy demand on both sides of the Atlantic. In London, demand is only routine and the price has slipped in idle trading conditions to less than £65 a ton. In the US the price is called at 11 cents a pound, New York.

Zinc is weak everywhere and a weight of stocks overhang markets in which demand is no better than routine. In America higher grades of zinc are still being sold at a discount but there is not as yet any indication that the spot price of 11½ cents a pound is in danger. In London the price is now fluctuating narrowly around £78 a ton.

Increase in Machine-tool Orders

With new orders for machine tools in March again exceeding deliveries, the industry's order-book increased to £110,400,000, about £1,000,000 more than the figures for January and February, and over 50 per cent. higher than the order-book for March, 1960, according to figures issued by the Machine Tool Trades Association. Net new orders during the month, at £11,700,000, were, however, 32 per cent. less than in March, 1960, and over the first three months of this year new orders were 16 per cent. less than the high figures reached in the corresponding period a year ago.

The increase in the March order-book, compared with February, was mainly accounted for by a rise in home orders, which rose from £84,600,000 to £85,500,000. Export orders remained about the same at £24,800,000. The increase in the order-book took place despite a rise in deliveries of machine tools, which in March were £10,600,000, nearly 18 per cent. higher than in February.

In addition to the Birthday Honours published in last week's JOURNAL, Mr. ERNEST O. STAVELEY, founder and principal of Staveley's Engineering Works, Atherton, Lancs, has been awarded the OBE; Mr. JOHN CHADWICK, managing director, Cobden Chadwick & Company, Limited, Oldham, is made an MBE, and Mr. A. G. PANTER, principal of A. G. Panter & Company, brassfounders, Bredbury, Cheshire, receives the BEM for services to Civil Defence.

Baker Perkins Foundry Machinery at work . . . *at Joseph Bloomer & Sons Ltd.*

This 'Cadet' Rotary Table Shot Blast machine has been installed at Joseph Bloomer & Sons Ltd. where its high standard of finish and sound design have made it an extremely useful addition to this company's foundry equipment. This machine includes our patented bi-phase impeller system with low power consumption. No pits or special foundations were necessary. Please write for full details.

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Foundry Machinery Division

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HISTORICAL NOTE

Joseph Bloomer & Sons Ltd. were established in 1860. At their Ladysmith Foundry and Chain Works, which are in Cradley, Staffordshire, they produce a wide range of castings for gas and calor gas cookers, agricultural and textile machinery, the motor industry, continuous burning fires and stoves and many other applications.

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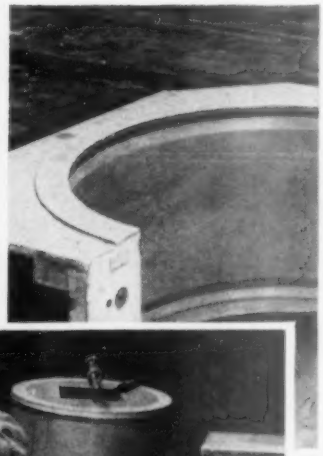

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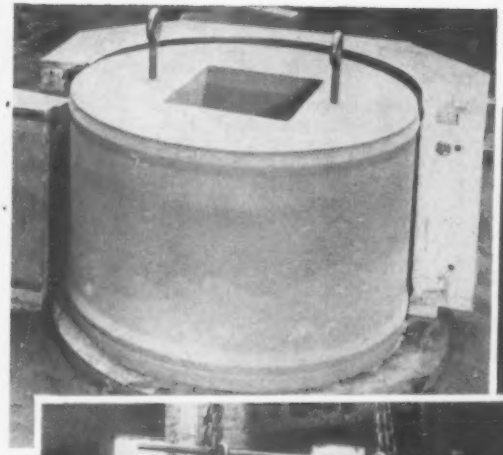

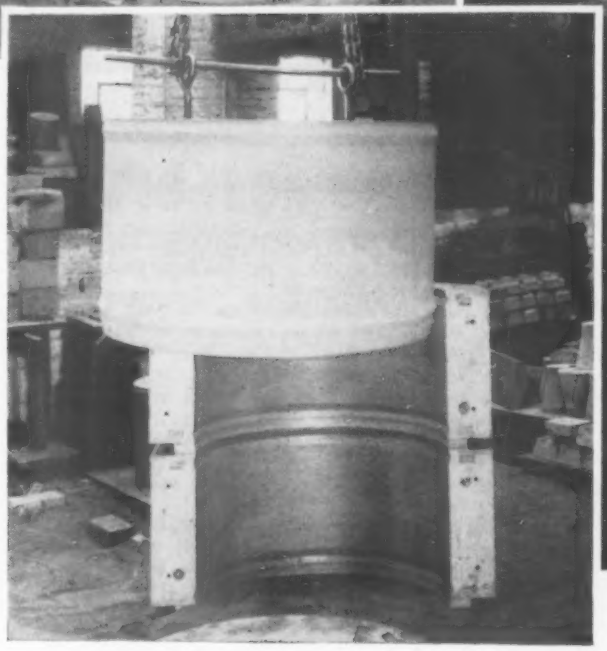

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated. In accordance with Iron and Steel Board Price Determination, 1961, No. 2, the prices of products listed below coming under the board's control are increased by 1 per cent.)

June 21, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d. South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 0s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s.10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 10s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 13s. 3d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free £275 0s. 0d.; 96/98 per cent., £285 0s.0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 0d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4s. 0d

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £234 15s. 0d. to £235 0s. 0d.; three months, £238 5s. 0d. to £238 10s. 0d.; settlement, £235 0s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 3½d. per lb.; rods, 253s. 6d. per cwt. basis; 20 s.w.g., 388s. 6d. per cwt.

Tin.—Cash, £902 10s. 0d. to £905 0s. 0d.; three months £913 0s. 0d. to £914 0s. 0d.; settlement, £905 0s. 0d.

Lead (Refined Pig).—Second half June, £63 17s. 6d. to £64 2s. 6d.; second half September, £65 10s. 0d. to £65 12s. 6d.; settlement, £64 2s. 6d.

Zinc.—Second half June, £77 0s. 0d. to £77 2s. 6d.; second half September, £78 2s. 6d. to £78 5s. 0d.; settlement, £77 2s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £116 2s. 6d.; rolled zinc (boiler plates), all English destinations, £113 17s. 6d., zinc oxide (Red Seal); d/d buyers' premises, £95 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10⅝d. per lb.; sheets to 10 w.g., 202s. 6d. per cwt.; wire, 2s. 8½d.; rolled metal, 202s. 6d. per cwt.

Brass (Brazing).—BS1400, B3, £178; B6, £226.

Brass (High Tensile).—BS1400, HTB1, £195; HTB2, £214; HTB3, £232.

Gunmetal.—BS1400, LG2, £221; LG3, £231; G1, ½%, £298; G1, 1%, £288.

Phosphor Bronze.—BS1400, PB1 (AID released), £315 BS1400, 90/10/1, £303.

Leaded Phosphor Bronze.—BS1400, LPB1, £244.

Phosphor Bronze Strip, etc.—Strip, 299s. 9d. per cwt. wire, 4s. 2¾d per lb.; rods, 3s. 5d.; tubes, 3s. 5d.; chill cast bars, solids 3s. 5d.; cored 3s. 6d. (CHARLES CLIFFORD LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £230 0s. 0d. Quicksilver, ex-warehouse, £67 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £248; AB2, £256.

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SITUATIONS WANTED

ENERGETIC practical Foundryman with six years' managerial experience, cast iron, malleable and some non-ferrous, mechanised and jobbing, seeks post as customer liaison officer. Box EP815, FOUNDRY TRADE JOURNAL.

PATTERN MAKER due to retire seeks occasional work. Own workshop. South Glos. Box PM816, FOUNDRY TRADE JOURNAL.

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WE require a CHIEF METALLURGIST to take over full technical responsibility for Melting and Laboratory control in our High Frequency and Cupola Melting Plants. Practical experience and A.I.M. standard are essential. A good basic salary will be paid and there are various other attractions about the position. Written applications should be addressed in confidence to the MANAGING DIRECTOR, The North Eastern Iron Refining Company, Ltd., Stillington, Stockton-on-Tees.

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Foundry Trade Journal

MANAGING DIRECTOR required by NON-FERROUS FOUNDRY situated west of London. Applicants should have technical knowledge and foundry production experience in casting aluminium, brass and bronzes and have connections with industry using these castings. The company is a member of a small group of companies carrying out an ambitious expansion programme and the directorship holds excellent prospects. Full particulars including age and commencing salary which will be augmented as company progresses, to Box MD814, FOUNDRY TRADE JOURNAL.

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SALES REPRESENTATIVE required by large repetition Iron Founders, North Midlands. Previous experience in engineering or foundry trades essential, good prospects leading to executive position, car provided, pension scheme. Write stating age, experience and salary required. Box SR795, FOUNDRY TRADE JOURNAL.

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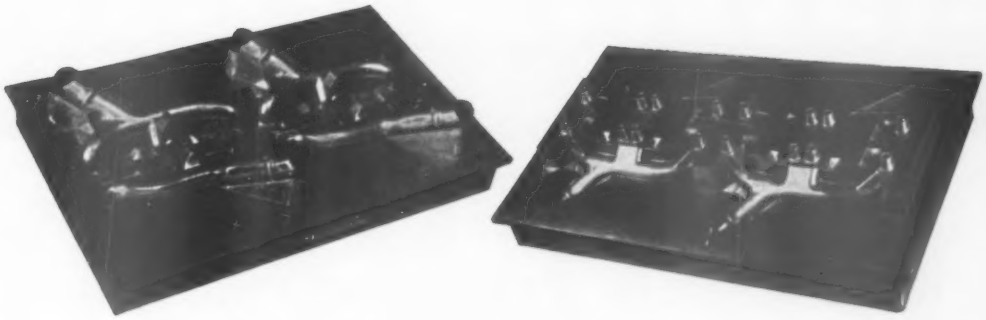

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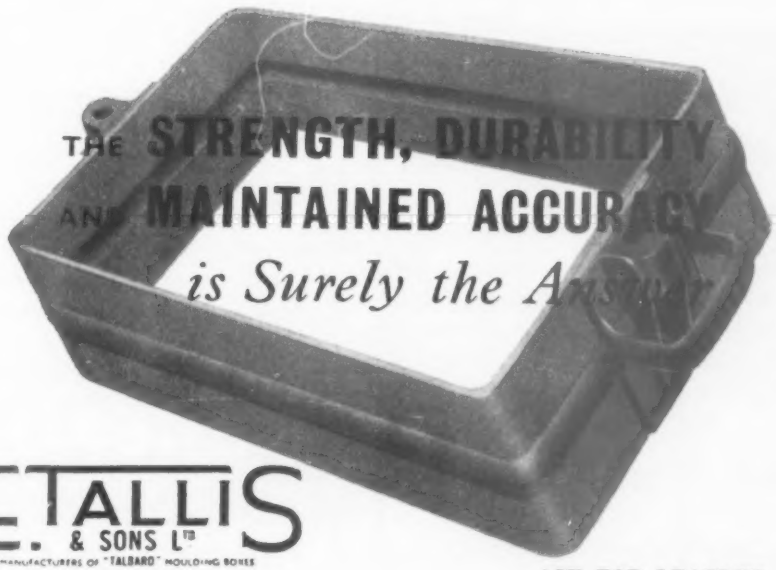

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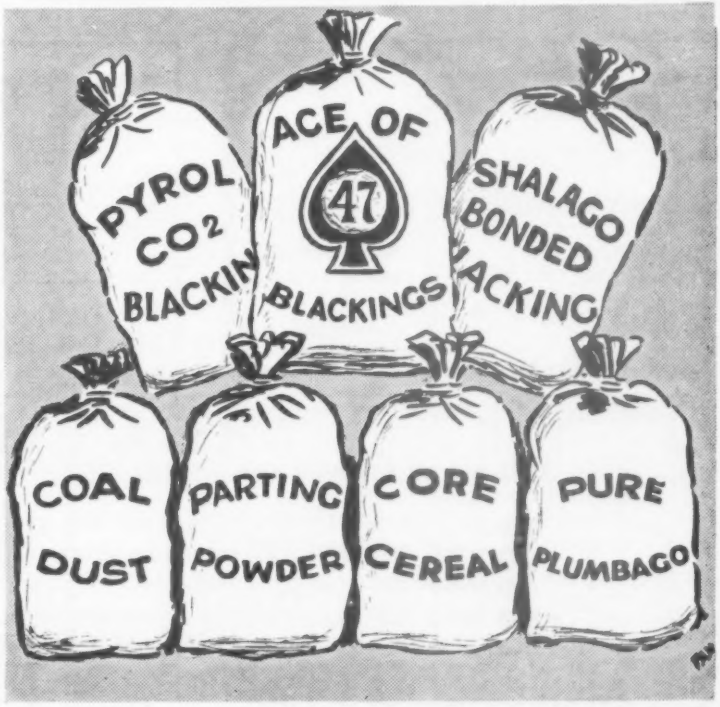

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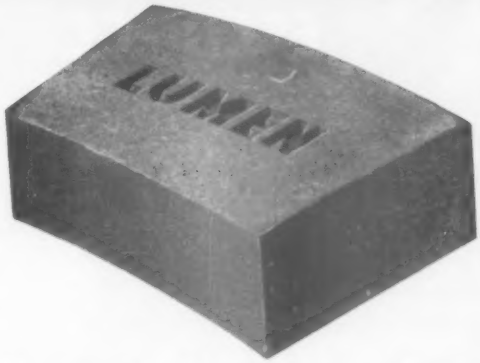

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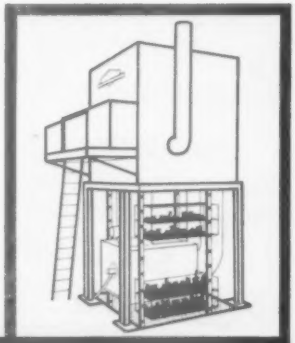

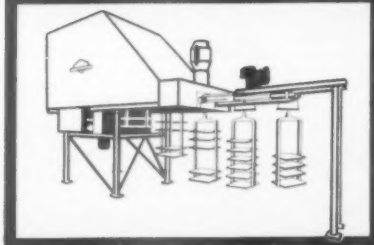

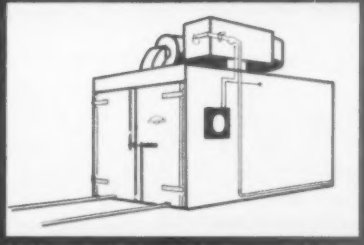

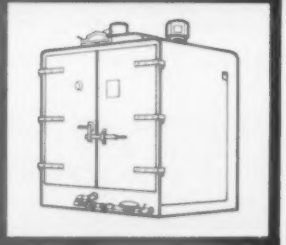

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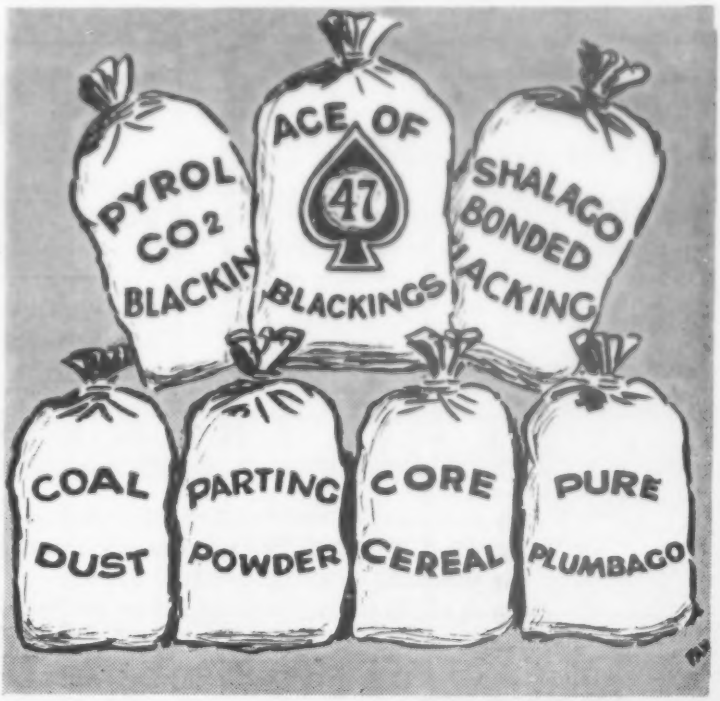

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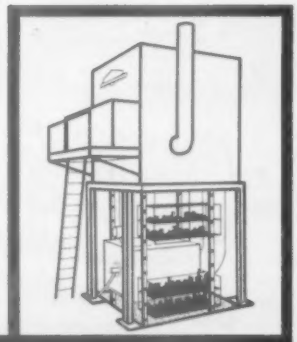

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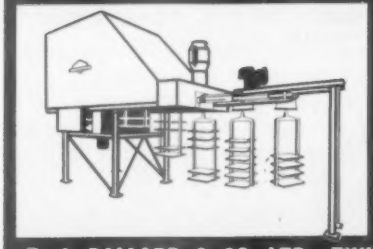

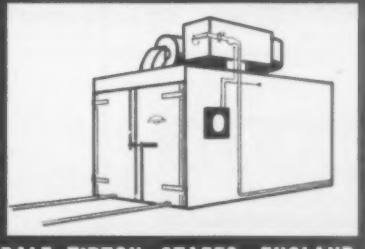

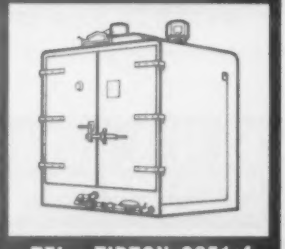

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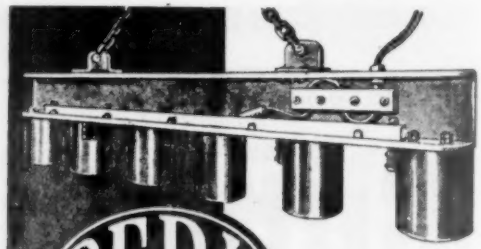

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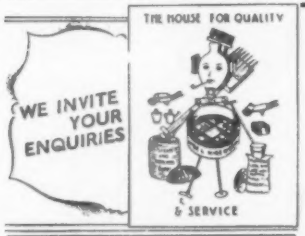

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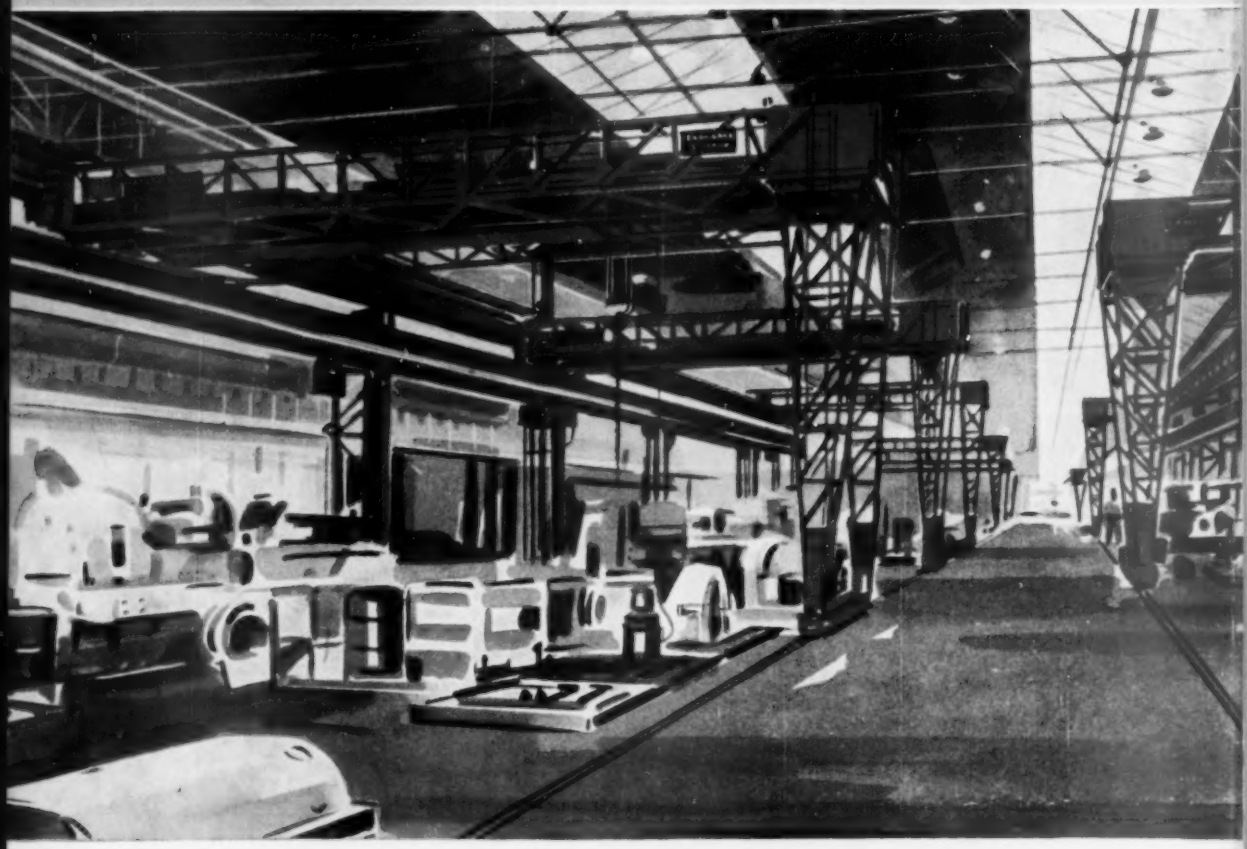

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